

Woody Plants of Utah

Woody Plants of Utah

A Field Guide with Identification Keys to Native and Naturalized Trees, Shrubs, Cacti, and Vines

Renée Van Buren,
Janet G. Cooper,
Leila M. Shultz,
Kimball T. Harper

Photographs by R. Van Buren and others
Diagrams by J. G. Cooper

Utah State University Press
Logan, Utah
2011

Copyright © 2011 Utah State University Press
All rights reserved

Utah State University Press
Logan, Utah 84322-3078
USUPress.org

ISBN: 978-0-87421-824-4 (paper)
ISBN: 978-0-87421-825-1 (e-book)

Manufactured in China

Printed on acid-free, recycled paper

Library of Congress Cataloging-in-Publication Data

Woody plants of Utah : an identification key and field guide to native and naturalized trees, shrubs, vines, and cacti / Renee Van Buren ... [et al.] ; photographs by R. Van Buren ; plant diagrams by J.G. Cooper.

p. cm.

Includes bibliographical references and index.

ISBN 978-0-87421-824-4 (pbk.) — ISBN 978-0-87421-825-1 (e-book)

1. Woody plants—Utah—Identification. 2. Woody plants—Utah—Pictorial works. I. Van Buren, Ren?e.

QK189.W66 2911

582.1609792—dc22

2011014684

Contents

	<i>Preface</i>	<i>vii</i>
1	Introduction to Woody Flora	1
2	Major Utah Plant Community Types	9
3	Key to Utah Woody Plants	27
4	Gymnosperm Descriptions	105
5	Angiosperm Descriptions	124
	<i>Glossary</i>	<i>467</i>
	<i>Appendix</i>	<i>485</i>
	<i>References</i>	<i>463</i>
	<i>Author</i>	<i>513</i>
	<i>Index</i>	<i>000</i>

Preface

This is a comprehensive work on the native woody flora of Utah. It comprises 152 genera, 385 species, and 446 taxa assigned to 51 different plant families. Also covered are less than a dozen species that have been introduced and are now naturalized in our wild landscapes. We make no attempt to include the many cultivated ornamentals that line our city streets, parks, and residences. We have provided dichotomous keys, plant descriptions, habitat and range information, photographs, and Utah distribution maps for each species. In Chapter One we discuss the woody habit and the ecological role woody plants play in our landscapes. Chapter Two describes characteristics of the major plant communities of Utah. These communities give us a broad sense of place in terms of the vegetation of an area. The keys in Chapter Three, and elsewhere in this text, are written using primarily vegetative characteristics, such as leaves and stems, for plant identification. This allows the reader to identify plants even when flowers are absent. Traditionally, identification keys concentrate on reproductive characters, and many are available from other sources, such as Welsh et al. (2008). Within some of the final couplets (i.e., the paired sets of key leads) of the keys, flower and fruit characteristics are provided to support correct identification. Chapters Four (gymnosperms) and Five (angiosperms) offer plant descriptions for each species (and some varieties or subspecies), accompanied by photographs, habitat characteristics, and their geographical and ecological context, all of which will aid in proper identification. The glossary (with many of the terms illustrated) will be helpful to the reader, especially when using the keys, to become familiar with botanical terms describing aspects of plant morphology. With keys, brief descriptions, range maps, and photographs, we hope that readers will be able to successfully identify the native woody flora of Utah and adjacent areas. Our intention is that professionals and students of botany, hobby

naturalists, and curious wanderers will make this field guide one of their most frequently consulted references.

Methodology

For taxonomic treatments, we have utilized the most recent standards available, which include *A Utah Flora* (Welsh et al. 2008), the *Flora of North America* series (Flora of North America Editorial Committee 1993+), and the multiple volumes of the *Intermountain Flora* (Cronquist et al. 1972+). On rare occasions, we have made some carefully considered interpretations of our own. Species names and authors generally follow standards described in the TROPICOS database (<http://www.tropicos.org>).

The 51 families and 385 species in this work include 11 species that are introduced and have become naturalized in the state. Many of the species have varieties or subspecies that are recognized in Chapters Four and Five but may not be included in the Chapter Three keys. We have made little attempt to identify and describe all the hybrids that may occur, but we have recognized those that are most commonly observed. We have tried to include the most recently accepted nomenclature—along with synonyms and common names—in order for this book to be useful to botanists and naturalists at all levels of interest and experience. The authors have collected most of the taxa included in this book, and voucher specimens are deposited at the Utah Valley University herbarium (UVSC), which is available online at <http://herbarium.uvu.edu/virtual/>. Range maps are based on voucher specimens deposited at Brigham Young University (BRY); University of Utah (UT); and Utah State University Intermountain Herbarium (UTC), as originally reported in Albee et al. (1988). The recent online revisions of that work by Shultz et al. (2006; 2010) bring nomenclature in line with current publications and add collections made since the hard copy version was published. See <http://earth.gis.edu/plants/> and click on “maps” for species distribution. Information from UVSC has been added to the maps printed here, which is reflected in the habitat and range section of the descriptions. For the range maps, the circles represent known locations from the herbaria mentioned above and the squares are locations provided by the Division of Wildlife Resources Heritage program.

Acknowledgements

We would like to thank the Department of Biology and the College of Science and Health, Utah Valley University (UVU); Noel Holmgren,

Susan Meyer, Jim Harris, Leigh Johnson (Polemoniaceae), Barbara Ertter, Walt Fertig, Dorde Woodruff (Cactaceae), and Daniel Fairbanks (*Atriplex*) for content and technical review and invaluable edits and suggestions; Scott Hatch for design suggestions and editing; the S. L. Welsh Herbarium at Brigham Young University; Rex Allen for photo editing and preparation; Doug Ramsey at Utah State University's GIS lab for providing the digitized version of range maps for the species (for online updates of the digital atlas, visit <http://earth.gis.usu.edu/plants/index.html>); Jason Alexander at the Utah Valley University Herbarium (UVSC) for curation of voucher specimens and several insightful consultations; Jonathon and Downing Van Buren and Glenda Egbert for data entry and research; Ally Searle, UVU botany lab manager, and students of UVU Wildland Shrub classes (2006–2010), who have field tested the keys and provided important feedback; for contributing photos, Jim Harris, Sherel Goodrich, Dorde Woodruff, Walt Fertig, Al Schneider, Dean Stock, Capitol Reef National Park, Gary Brown, Susan Meyer, Richard J. Shaw, and Laurel Wright. All photos not credited to a photographer listed here are by Renée Van Buren. To our editor, John Alley, and the Utah State University Press staff, we extend sincere thanks for your patience, support, and encouragement. To Kathleen Capels, our copy editor, thank you for your attention to detail and the many careful improvements to the manuscript. A special thanks is extended to our families and dear friends, who have been there with enduring encouragement and support.

Readers, we would appreciate notification of errors, omissions, and other comments; send them to renee.vanburen@uvu.edu.

Renée Van Buren would like to express sincere thanks to her coauthors who have enriched her life by their years of teaching, mentoring, and most valued friendship.

Introduction to the Woody Flora

A book on the native woody plants of Utah could vary in length, depending on how one defines the term “woody.” For the purpose of this book, we define woody plants as those retaining woody tissue aboveground season after season. This definition includes taxa described as trees, vines, shrubs, cacti, subshrubs, and some suffrutescent species (decisions on which taxa to include become difficult—no doubt others might have different interpretations).

The anatomy of the stem usually determines whether a plant is woody or not. Woody plants have stems that persist aboveground through seasons unfavorable for growth, due to drought or low temperatures. Such plants produce secondary tissue (secondary xylem, phloem, and bark) from lateral meristems that result in an increase in girth. The ensuing sturdiness allows plants to grow taller and compete more favorably in the race to reach light. This growth in girth, in addition to apical growth resulting in increased height, permits these plants to become large and long lived. Arguably, the largest, oldest, and tallest organisms today are woody plants (giant sequoia, bristlecone pine, and coastal redwood).

This woody habit may be considered advantageous in various ways. Clearly, the perennial habit reduces problems associated with plant establishment, since conditions suitable for seedling growth may not be present every year. Woodiness is also likely to reduce plant palatability to herbivores and discourage herbivory (McKell 1975; Young, Eckert, and Evans 1979). Woodiness may also enhance a plant’s ability to root

Table 1. Number of woody genera, species, and taxa in each family that occur in Utah, arranged from the family with the largest number of woody species to the families with the smallest number of such species.

Family	No. genera	species	taxa
Asteraceae	28	82	110
Cactaceae	10	34	38
Rosaceae	17	33	34
Salicaceae	2	28	28
Amaranthaceae	7	17	25
Polygonaceae	1	17	30
Ericaceae	7	15	15
Fabaceae	7	12	13
Grossulariaceae	1	12	12
Pinaceae	4	11	11
Agavaceae	3	9	11
Polemoniaceae	4	8	9
Rhamnaceae	2	6	7
Caprifoliaceae	3	6	6
Solanaceae	2	6	6
Plantaginaceae	1	6	6
Hydrangeaceae	4	5	5
Oleaceae	3	5	5
Elaeagnaceae	2	5	5
Anacardiaceae	3	4	5
Ephedraceae	1	4	5
Lamiaceae	4	4	4
Betulaceae	3	4	4
Brassicaceae	2	4	4
Ranunculaceae	1	4	4

deeply enough to ensure the acquisition of adequate water for survival (Thatcher and Hart 1974).

A relatively large number of woody plants have their origin within Utah's state boundaries. Many of these woody endemics are species in the families Asteraceae, Polygonaceae, and Cactaceae. As indicated in table 1, the family Asteraceae (sunflower family) is represented in Utah by 82 woody species (110 taxa), over twice the number of the next largest family, Cactaceae (35 species, 40 taxa). Francis (2004) reports that there are 5281 shrubby species and about 1300 tree species that are native or naturalized in the United States and its territories. Francis also reports that families with the largest number of woody species include Asteraceae, Rosaceae, Fabaceae, Cactaceae, and Ericaceae, in descending order.

Vitaceae	2	3	3
Family	No. genera	species	taxa
Berberidaceae	1	3	3
Cupressaceae	1	3	3
Fagaceae	1	3	3
Rubiaceae	1	3	3
Sapindaceae	1	3	3
Cannabaceae	2	2	2
Celastraceae	2	2	2
Rutaceae	2	2	2
Adoxaceae	1	2	2
Krameriaceae	1	2	2
Polygalaceae	1	2	2
Bignoniaceae	1	1	1
Boraginaceae	1	1	1
Caryophyllaceae	1	1	1
Cornaceae	1	1	1
Crossomataceae	1	1	1
Garryaceae	1	1	1
Loasaceae	1	1	1
Sarcobataceae	1	1	1
Scrophulariaceae	1	1	1
Simaroubaceae	1	1	1
Tamaricaceae	1	1	1
Ulmaceae	1	1	1
Verbenaceae	1	1	1
Zygophyllaceae	1	1	1
Total	51	152	385
		446	

A book on the trees and shrubs native to Utah may appear to the casual observer as one needing very few pages to offer a full description of all the species occurring naturally in the state, especially in the case of trees. Utah is not a center for tree diversity. In temperate climates that are seasonal, due to periods of drought or adverse temperatures (such as those that occur in Utah), shrubby species are many times more numerous than tree species. The moisture required to support the tree habit is simply absent in the current and recent past climate of the state, except in moderately high elevations on mountain ranges and along perennial streams. However, globally, trees are extremely important, as they encompass 27% of the earth's surface that is not covered by water (FAO World Resources 2000–2001). Tree species contribute perhaps 25% of the known 350,000–450,000 vascular plants of the world (Scotland and

Wortley 2004). Tree species usually require more moderate and better-watered environments than shrubby species; thus trees are more restricted in their ecological limits and distribution. Shrubs, rather than trees, extend into environments more subject to drought. Woody plants are less common in environments where the rooting zone is poorly aerated, due to flooding or clayey soils having only slow rates of gas exchange.

There are several definitions available for distinguishing trees from shrubs, such as Donoghue (2005), who defines trees as “tall plants, with a thickened single trunk, branching well above ground level.” This definition, however, requires some accommodation for plants that are growing in environments where elevation, moisture, light, or herbivores may cause abnormal growth. One example of the impact environment can have on the growth habit of a species is the Krumholtz effect that occurs at timberline, where mature Engelmann spruce are reduced to a shrubby thicket, compared with their height of up to 40 meters on more favorable sites.

For the purpose of this book, trees are generally defined as usually single trunked and more than 4 meters tall at maturity. However, many species we categorize as trees because of their height may have more than one trunk at ground level. In addition, some trees may be less than 4 meters tall but have a single trunk. Our ability to distinguish trees from shrubs becomes even more difficult when we are in short-statured community types, such as desert environments, where moderately tall shrubs seem tree-like relative to other vegetation.

Woody plant species provide many benefits to humans, such as beverages, medicines, lumber for infrastructure and shelter, fuel, oils, industrial chemicals, spices, dyes, and hundreds of different fruits, seeds, and some vegetative parts used as food. The 23,000 tons of newsprint used daily in the United States originates from woody plant products (Uno et al. 2001). Cultivars of woody plants line our city streets, yards, and parks as ornamentals.

Ecological services that woody plants provide to ecosystems include the production of oxygen and the uptake of carbon dioxide in vast forests, both boreal and tropical. Woody plants stabilize soils, thus reducing erosion and flooding, and provide food, habitat, and cover for wildlife. Since woody plants are often long lived, they are used to define particular plant communities, such as pinyon-juniper or sagebrush, or conifer forests.

Some plants form important symbiotic relationships with various bacteria, resulting in nitrogen fixation, which is significant, since

nitrogen is often a limiting factor in plant growth. The most common microbial symbiont is *Rhizobium*, a bacterium that invades the root tips of plants (both herbaceous and woody) of the family Fabaceae (*Acacia*, *Parryella*, *Prosopis*, *Psoralea*, and *Robinia*). Another bacterial symbiont, *Frankia*, invades the roots of plants in the families Betulaceae (*Alnus incana*), Elaeagnaceae (*Elaeagnus commutata*), Rhamnaceae (*Ceanothus* spp.), and Rosaceae (*Coleogyne*, *Cercocarpus* spp., and *Purshia* spp.). Trees and shrubs (and most herbaceous plants) also form mutualistic relationships with fungal partners, or mycorrhizae, which aid the plant in nutrient and water uptake from the soil. Mycorrhizae are the link from the plant to the soil and help maintain soil structure, aid nutrient recycling, and increase the bacteria's ability to form nodules for nitrogen fixation. These important functions are especially critical to plants that occupy arid environments, such as those that occur in the Intermountain West.

Some woody species display poisonous qualities to domestic animals or to man, and they can cause reactions ranging from mild discomfort to possible death. Examples of poisonous woody plants include such species as poison ivy (*Toxicodendron rydbergii*), snakeweed (*Gutierrezia sarothrae*), scrub oak (*Quercus gambelii*), horsebrush (*Tetradymia canescens*), greasewood (*Sarcobatus vermiculatus*), skunkbush (*Rhus aromatica*), and European bittersweet (*Solanum dulcamara*). Seasonal discomfort due to allergies caused by juniper, sagebrush, rabbitbrush, and many other woody species also has negative impacts on us.

Approximately 75% of Utah's woody species are pollinated by animals, including birds, insects, bats, and rodents. The remaining species, notably *Artemisia* in the Asteraceae and *Atriplex* in the Amaranthaceae, are wind pollinated.

We should comment briefly on a group of subshrubs that are parasitic on various trees in the state and play an important role in the ecology of our wildlands. In Utah, parasitic mistletoe belonging to the family Viscaceae are represented by two genera containing eight species. The genera are separated by morphological characteristics of the flower and fruits and by their host plants. The genus *Arceuthobium* has six species that occur in Utah and grow primarily on conifers (*Abies*, *Picea*, *Pseudotsuga*, and *Pinus*). The genus *Phoradendron* is represented by two species: one grows primarily on juniper, and the other on *Acacia* and sometimes *Larrea*. Although tempting, plant hosts alone cannot be used to correctly identify the parasitic species of mistletoe, as more than one species may grow on a single host species; we refer you to Welsh et al.



Table 2. Mistletoe occurring in Utah, listed by botanical name, common name, and primary host plant.

Botanical name	Common name	Host plant and location
<i>Arceuthobium abietinum</i>	Fir dwarf-mistletoe	<i>Abies concolor</i> in western Kane Co.
<i>Arceuthobium americanum</i>	Lodgepole pine dwarf-mistletoe	Lodgepole pine, ponderosa pine, and other pines in the Uinta Mts., less commonly in the northern Wasatch Range
<i>Arceuthobium cyanocarpum</i>	Limber pine dwarf-mistletoe	<i>Pinus flexilis</i> ; less commonly on ponderosa and lodgepole pines
<i>Arceuthobium divaricatum</i>	Pinyon dwarf-mistletoe	Pinyon pines in the southern part of the state
<i>Arceuthobium douglasii</i>	Douglas fir dwarf-mistletoe	Douglas fir; on <i>Abies concolor</i> , <i>A. lasiocarpa</i> , <i>Picea pungens</i> , and/or <i>P. engelmannii</i> when occurring with Douglas fir
<i>Arceuthobium vaginatum</i>	Southwestern dwarf-mistletoe	Ponderosa pine and Engelmann's spruce of south-central and southwestern high plateaus
<i>Phoradendron californicum</i>	Acacia mistletoe	<i>Acacia greggii</i> , <i>Larrea tridentata</i>
<i>Phoradendron juniperinum</i>	Juniper mistletoe	Utah juniper

(2008), Cronquist et al. (3A, 1997), or another source for specific identification. These taxa are not included in the keys in Chapter Three or in the descriptions in Chapter Five, but instead are summarized in table 2.

Utah is rich in endemism relative to other of the United States. The number of endemics in our region increases if one ignores state boundaries and observes more natural boundaries created by topography, such as those proposed by Welsh and Atwood (2009). These authors suggest that 11 geoendemic areas can be identified in Utah. They discuss why the areas occur and list the plants that inhabit them. Most of Utah's endemic flora is herbaceous; however, at least 75 of the species we consider woody in our book are included in Welsh and Atwood (2009). Woody endemics are especially common in the families Polygonaceae and Asteraceae, two plant families well represented generally in the state (Stein, Kutner, and Adams 2000).

Although Utah has many endemic woody species with a limited range and distribution, there are other shrubs and trees that occur in nearly every county or region of the state. The most prevalent woody species statewide are listed in table 3. Most of them have very broad habitat requirements and occur in a variety of plant communities.

Table 3. The following species have been reported in every county in Utah and represent the woody species with the widest distribution (Welsh et al. 2008).

Scientific name	Common name	Plant family
<i>Acer glabrum</i>	Rocky Mountain maple	Sapindaceae
<i>Acer grandidentatum</i>	Bigtooth maple	Sapindaceae
<i>Amelanchier utahensis</i>	Utah serviceberry	Rosaceae
<i>Artemisia tridentata</i> subsp. <i>tridentata</i>	Big sagebrush	Asteraceae
<i>Artemisia tridentata</i> subsp. <i>vaseyana</i>	Mountain sagebrush	Asteraceae
<i>Berberis repens</i>	Creeping barberry	Berberidaceae
<i>Betula occidentalis</i>	Western river birch	Betulaceae
<i>Cercocarpus ledifolius</i>	Curl-leaf mountain mahogany	Rosaceae
<i>Cornus sericea</i>	Red-osier dogwood	Cornaceae
Scientific name	Common name	Plant family
<i>Eriogonum umbellatum</i>	Juniper sulfur flower	Polygonaceae
<i>Gutierrezia sarothrae</i>	Broom snakeweed	Asteraceae
<i>Holodiscus dumosus</i>	Mountain spray	Rosaceae
<i>Juniperus osteosperma</i>	Utah juniper	Cupressaceae

<i>Juniperus scopulorum</i>	Rocky Mountain juniper	Cupressaceae
<i>Monardella odoratissima</i>	Mountain monardella	Lamiaceae
<i>Opuntia polyacantha</i>	Pricklypear	Cactaceae
<i>Paxistima myrsinites</i>	Mountain lover	Celastraceae
<i>Petradoria pumila</i>	Rock goldenrod	Asteraceae
<i>Picea engelmannii</i>	Engelmann's spruce	Pinaceae
<i>Pinus flexilis</i>	Limber pine	Pinaceae
<i>Populus angustifolia</i>	Narrowleaf cottonwood	Salicaceae
<i>Populus tremuloides</i>	Quaking aspen	Salicaceae
<i>Prunus virginiana</i>	Chokecherry	Rosaceae
<i>Pseudotsuga menziesii</i>	Douglas fir	Pinaceae
<i>Purshia tridentata</i>	Bitterbrush	Rosaceae
<i>Quercus gambelii</i>	Gambel oak	Fagaceae
<i>Ribes cereum</i>	Wax currant	Grossulariaceae
<i>Ribes inerme</i>	Whitestem gooseberry	Grossulariaceae
<i>Ribes montigenum</i>	Mountain gooseberry	Grossulariaceae
<i>Rosa nutkana</i>	Nootka rose	Rosaceae
<i>Rosa woodsii</i>	Woods' rose	Rosaceae
<i>Rubus idaeus</i>	Wild raspberry	Rosaceae
<i>Sambucus caerulea</i>	Blue elderberry	Adoxaceae
<i>Symphoricarpos oreophilus</i>	Mountain snowberry	Caprifoliaceae
<i>Tetradymia canescens</i>	Mountain horsebrush	Asteraceae

2

Major Utah Plant Communities

Professionals and interested naturalists are usually introduced to the plant life of a region via a list of species known to occur in the area. Such species lists are technically known as floras. Floras are of unquestionable value to those interested in regional ecosystems, but they are of limited help to laymen seeking to understand the holistic aspects of landscapes readily discernable in an area.

Observers will easily recognize different aspects of the plant cover or vegetation in a locale. Forests are readily distinguishable from adjacent areas that support only herbaceous species or are dominated by shrubby plants that never grow taller than waist height. Other areas may appear to be barren rock, but upon closer study are seen to support a few distinctive, diminutive plant species that root and thrive in crevices in the stone. The viewer sees obvious variations in the vegetation in such overviews but can probably not identify any particular species. Such gross but distinctive aspects of regional plant life have come to be referred to as vegetation types, or plant communities.

Plant communities are characterized by the gross structure, or life form, of the prominent species in a particular habitat. Interestingly, species adapted to particular kinds of habitats often have similar life forms and longevity patterns. Large, long-lived, tree-like species require a perennial supply of water and mineral elements. At sites where the supply of such essentials is only seasonal or available from limited storage areas (such as shallow, porous rock; small crevices in rock; or accumulations of water- or wind-deposited sands or gravels), the adapted

plants are either small or possess life spans that match those periods in which requirements essential for life are present in quantities adequate to support life.

Such plant-environment relationships result in vegetation characteristics that differ remarkably over an area in which the availability of life's essentials vary widely through time or space. Consequently, the gross vegetation aspects change across any landscape.

In this book we have recognized 20 vegetation complexes, or plant communities, which are listed in table 4. We realize that other distinctive vegetation associations occur in Utah, but they usually dominate limited areas. Examples of such distinctive plant communities that we have not recognized here include hanging gardens, crevice plant assemblages, rock faces colonized by lichens and small-bodied algal taxa, and colonizers of often relocated deposits of sand or gravel.

In table 4, we have shown the range in elevation and precipitation that is possible for each of the 20 community types considered. The elevation ranges listed for major species in each community have been extracted from data in *A Utah Flora* (Welsh et al. 2008). A plant community is not equally well developed throughout its elevation range, as the development of each community complex will be modified by local topography, geology, and edaphic conditions. Precipitation variation within each plant community has been estimated from the relationship between precipitation and elevation along an elevation gradient observed in Washington and Iron counties in southwestern Utah. All data were extracted from files maintained by the Western Regional Climatic Center, Desert Research Institute, in Reno, Nevada.

Of the various plant communities recognized in table 4, eight are dominated by tree-sized plants, seven others are dominated by shrubby species that rarely grow over 6 or 7 meters tall, while five are dominated by herbaceous species. Tree-dominated communities include the pinyon-juniper communities of eastern and western Utah; the lower and higher elevation riparian vegetation types; and the forest communities dominated by Douglas fir, Engelmann spruce and subalpine fir, ponderosa pine, and aspen-mixed conifers. Shrub-dominated communities include salt desert shrub, xeric sagebrush, big sagebrush-grass, the Colorado Plateau shrub complex, the Mojave Desert complex, and the mountainbrush communities of northern and southern Utah. Herb-dominated vegetation communities include the halophyte subshrub complex, marshlands, tall forb assemblages of higher elevations, sedge meadows dispersed throughout the forest and alpine communities

Table 4. Elevational range, annual precipitation range, and estimated number of woody species of the vegetational community types of Utah. The number of woody species associated with each vegetational complex noted has been extracted from Welsh et al. (2008).

Community Complex	Elevational Range (m)	Precipitation Range (cm)	Number of woody species
Mojave Desert	670-1120	12-28	112
Halophyte	950-1670	22-41	12
Marshland	800-2100	17-53	0
Salt desert shrub	730-2840	20-73	102
Xeric sagebrush	1400-2800	35-71	153
Big sagebrush-grass	1220-3050	32-78	129
Colorado Plateau shrub	730-1830	20-47	142
Eastern pinyon-juniper	1220-2750	32-69	153
Western pinyon-juniper	820-2600	20-60	173
Northern mountainbrush	1125-2750	28-69	97
Southern mountainbrush	820-1710	20-41	112
Lower elevation riparian	700-2300	17-58	94
Higher elevation riparian	2300-3100	58-79	44
Ponderosa pine forest	1580-2675	38-67	116
Douglas fir forest	1525-2850	41-71	71
Aspen-mixed conifer forest	1450-3050	36-78	110
Tall forb	1900-3100	47-78	2
Sedge meadow	2100-3200	54-79	14
Spruce-fir forest	2400-3350	61-84	67
Alpine	3050-3900	76-96	16

above timberline. One might identify subdivisions within any major community type, such as wet meadows and dry meadows within the alpine community, or chaparral within the southern mountainbrush community. In addition, rare communities that do occur in Utah and harbor many endemic species include hanging gardens, rock crevices, sand dunes, bristlecone pine forests, Chinle soil outcrops, gypsum soil outcrops, pygmy sagebrush, Beaver Dam limestones, Arapian shale, Mancos mat saltbush, and others.

Communities dominated by herbaceous species

Halophyte complex

This community is characterized by saline soils with standing water (at least seasonally) or a water table within rooting zones where the



soils are often saturated. It is a mosaic of sparsely vegetated and barren playa flats. The dominant vegetation includes saltgrass, Utah samphire, annual samphire, and pickleweed, a woody shrub.

Marshland complex

Soils of marshlands are nonsaline and have either standing water or water that occurs within the rooting zone. The dominant species in this



community are taller than halophyte vegetation types (over 0.5 m) and are usually monocotyledons (grasses and grass-like species), with a variety of herbs such as cattail, rice cutgrass, western eupatorium, dogbane, and reed grass, a large, introduced grass species that is increasingly aggressive and troublesome.

Alpine communities

This community occurs at high elevations (usually above timberline) in mountains where exposure to wind, ice, light, and blown snow occur



Photo by Jim Harris

regularly. The soils are shallow and the growing seasons are very short. Approximately 16 woody species occupy this community type in Utah. Many of them are willows, such as arctic willow, snow willow, plane-leaf willow, and Cascades willow. Alpine com-

munities can be subdivided into wet meadows and dry meadows. Wet meadow vegetation includes sedges, grasses (tufted hairgrass, Idaho fescue, sheep fescue, alpine timothy, spike trisetum), and forbs (moss campion, cushion paronychia, Rydberg's sandwort, dwarf clover, and American bistort). Suffrutescent woody species—such as whortleberry and bog laurel—may be present, along with low-growing willows. Dry meadows include herbaceous species such as yarrow, dandelion, Richard's geranium, and *Penstemon* species, but these sites have few woody plants.

Sedge meadow complex

The soils are well drained but often seasonally saturated at middle to high elevations. This community is dominated by sedges and other



grass-like species. Approximately 14 woody species are found in this community, including willows, river birch, whortleberries, and other ericaceous species.

Tall forb complex

This community occurs at mid to high elevations where the soils are well drained. The dominant vegetation consists of perennial broad-



leaved herbs over 30 cm tall—such as sunflowers, goldenrod, groundsel, lupine, aster, paintbrush, bluebells, and others—in areas adjacent to forests. Sagebrush species are among the few woody species that occur in this vegetative type.

Communities dominated by shrub species

Salt desert shrub complex

This community is often found at the edge of halophyte vegetation, where the soils are still somewhat saline in valley bottoms or broad



plains. It is characterized by intense light exposure, cold winters, and hot summers, and it is dominated by low-stature shrubs such as saltbush, shadscale, winterfat, gray molly, spiny hopsage, and greasewood.

Mojave Desert complex

The Mojave Desert complex occupies only the southwestern corner of Utah, where plant growth is not limited by sustained freezing temperatures.



The Mojave Desert is the driest desert in North America. Precipitation falls primarily in the winter, with rare but violent summer thunderstorms. The soils are usually nonsaline and poorly developed. Extreme summer and winter temperatures prohibit many plants from occupying this region. Woody species

in this community are generally low statured and include Joshua tree, creosote bush, blackbrush, cholla, ratany, and bursage.

Xeric sagebrush complex

The soils are often associated with shallow hard pans (calcium carbonate layer) that can limit plant growth and development. This



community is second to pinyon-juniper communities in its number of woody species. Dominant shrub species include black sagebrush, Wyoming sagebrush, budsage, snakeweed, and several grasses, such as squirreltail, sixweeks fescue, Indian ricegrass, and sand dropseed.

Colorado Plateau shrub complex

This community is influenced by summer monsoons. Snow and freezing temperatures are rare. The soils are often sandy, or with a shallow



calcium carbonate pan. Sonoran Desert species are prominent in the landscape. The diversity of woody plants is very high and includes blackbrush, sand sagebrush, Bigelow's sagebrush, saltbush, rabbitbrush, viscid rabbitbrush, green ephedra, buffaloberry, Utah serviceberry, and Frémont's barberry.

Big sagebrush-grass complex

This community usually occurs on nonsaline soils where the calcium carbonate pan is deeper than 40 cm. It is dominated by shrubs, such



as basin big sagebrush, mountain sagebrush, Wyoming sagebrush and rabbitbrush. Herbaceous species are common (arrowleaf balsamroot, milkvetch, and phlox), as well as many grasses (such as Idaho fescue and blue-bunch wheatgrass).

Southern mountainbrush complex

This community type occurs in areas usually with less than 41 cm annual precipitation, at elevations below 1800 m. The soils are typically



well drained. Many evergreen species—such as Dixie live-oak, dwarf mountain mahogany, and manzanita—are included in this community. Deciduous species include Gambel oak, silk-tassel bush, and Mojave ceanothus. The chaparral community of Washington Co. is included in this

complex. Many of these species are well adapted for fire and recover quickly following disturbances.

Northern mountainbrush complex

This community, common on foothills and at desert edges, is dominated by shrubs and usually occurs between 1100 and 2800 m. Pre-



cipitation is usually less than 70 cm per year. Nutrients are recycled quickly. Woody plants occurring here include Gambel oak, bigtooth maple, mountain sagebrush, alderleaf mountain mahogany, curl-leaf mountain mahogany, mountain snowberry, and serviceberry. This community is heavily utilized by birds and wildlife.

Communities dominated by tree species

Eastern pinyon-juniper complex

Over 150 woody species occur in forests dominated by Utah juniper and two-needle pinyon pine. Other common shrubs found here

include bitterbrush, cliffrose, Utah serviceberry, serviceberry, curl-leaf mountain mahogany, and singleleaf pinyon pine (this latter species at the western edges of the complex, where this community type overlaps with the pinyon-juniper communities in the western portion of the state).

This complex provides

important wintering grounds for deer and food for various birds and mammals.



Western pinyon-juniper complex

Over 170 woody species occur in this woodland, the highest woody-species richness of any Utah community type. It is dominated by Utah

juniper and singleleaf pinyon pine. Other shrubby species include bitterbrush, cliffrose, Wyoming sagebrush, narrow leaf yucca, and pricklypear.



Ponderosa pine forest

This forest type dominates upper elevation mesas and mountains of the Colorado Plateau where mild winters and biseasonal rainfall



occur. It is also found in other areas of the state where the soils are more acidic. This community type has increased in size during the past 12,000 years as the climate has become warmer and more arid. More than 115 woody species—including ponderosa

pine, greenleaf manzanita, creeping barberry, Rocky Mountain juniper, bitterbrush, and deer-brush—occur in various subtypes of this community. Historically, fire played a primary role in maintaining this vegetative type. These species have adaptations to withstand fire; however, human practices of fire suppression have led to increased tree density and litter, resulting in intense fires that cause death of the dominant species. Following such fires, native species are often replaced with introduced weedy herbaceous species.

Douglas fir forest

These forests are dominated by Douglas fir where soil pH is 5–7.6, and where the soils have a medium to coarse texture and are well



drained. These forests are an important source of lumber. They include such species as white fir, blue spruce, creeping barberry, blue elderberry, mountain snowberry, and chokecherry. This community type provides important habitat for forest birds such as crossbills, chickadees, and grouse.

Aspen-mixed conifer forest

This community type supports about 110 woody species in Utah. The vegetation includes both conifers and broad-leaved plants, such as



quaking aspen, Douglas fir, blue spruce, mountain sagebrush, white fir, mountain lover, Rocky Mountain juniper, and common juniper. Aspen stands display vast hillside swaths of yellow and orange on our mountain slopes and high valleys during the fall.

Spruce-fir forest

Frequent strong winds, shallow and nutrient-poor soils, and long cold winters characterize this community, which develops near timberline.



The dominant plants are Engelmann's spruce and subalpine fir, which often demonstrate a Krumholtz growth habit, where species develop as horizontal shrubs, rather than trees, as an adaptation to wind and cold temperatures. Other woody

plants that occur in this community include gooseberries, currants, lodgepole pine, western bristlecone pine, mountain lover, creeping barberry, and whortleberries.

Lower elevation riparian

This community develops along streams or rivers at lower elevations, with dominant trees and shrubs that include Frémont's cottonwood,



velvet ash, boxelder, serviceberry, bigtooth maple, and willows. Additionally, these corridors have been invaded by introduced species—such as tamarisk, Russian olive, and crack willow—that now dominate many low elevation riparian systems.

Higher elevation riparian

This community type occurs along perennial streams and is dominated by Booth's willow, graybark willow, and other willow species. It also



includes narrowleaf cottonwood, thinleaf alder, western river birch, red-osier dogwood, and river hawthorn. These woody plants stabilize streambanks and provide nitrogen, shade, and cover for aquatic organisms, and habitat for birds and mammals.

In terms of area, the big sagebrush-grass and pinyon-juniper vegetation types are by far the most extensive in Utah and, combined, account for roughly half the area of the state. Other plant communities—such as halophyte, marshland, tall forb, sedge meadow, and Mojave Desert shrub—though visually distinct, cover relatively small portions of the land area. All forest types combined (pinyon-juniper excluded) cover less than 15% of the state's surface. Community types do not occur with clear, convenient boundaries but usually transition from one to another, making identification somewhat subjective. To the right is a key that may be useful in identifying a particular plant community.

Management and restoration of woody plant communities

Shrublands are extensive in western North America and have been utilized and seriously impacted by man throughout recent millennia. Even before the advent of Europeans, native peoples purposefully burned shrublands. Such fires were utilized to drive game or to create conditions that would attract certain prey animals. These fires no doubt encouraged the growth of numerous herbaceous species that occurred sporadically in the understory of the shrubland. The fires simultaneously reduced the dominance of woody species.

Since the European colonization of the United States, man has eradicated native vegetation on millions of acres and created cultivated fields or built villages and cities in their place. Over larger areas, man has greatly altered wildlands through recreational activities, heavy grazing by domestic livestock, and the active suppression of natural or accidental wildfires. Shrubs often increase on heavily grazed lands and assume dominant roles on lands once occupied by plants more diverse and useful to wildlife and domestic livestock. Man thus often launches expensive programs to eliminate woody plants from certain landscapes and favor plants useful for domesticated animals. Programs to destroy juniper, pinyon pine, sagebrush, or other woody plants on rangelands or farmlands are commonplace on western American wildlands. Procedures used for control include managed wildfire, disk plowing, chaining, shrub cutting, and herbicidal treatments (McKell 1975; Charlet 2008).

After more than 150 years of such human-driven impacts on Intermountain wildlands, shrublands have been impacted in two conspicuous ways. In most situations, shrublands have been depleted of understory herbs. In other cases, vigorous suppression of wildfires has permitted small trees such as juniper (both Utah and Rocky Mountain)

Key to Plant Community Types of Utah

- 1a Vegetation dominated by herbaceous or suffrutescent species.....**2**
- 1b Vegetation dominated by shrubs or trees**6**
- 2a Soils with standing water (at least seasonally) or a water table within
 rooting zones (basins, lowlands, playas)**3**
- 2b Soils well drained (slopes and uplands)**4**
- 3a Soils saline; saltgrass, pickleweed, and samphire as common compo-
 nents**halophyte complex**
- 3b Soils nonsaline; dominant species tall (over 0.5 m), usually mono-
 cotyledons, such as cattail, bulrush, reed grass, rice cutgrass, and
 a variety of broad-leaved herbs (western eupatorium and dog-
 bane).....**marshland complex**
- 4a Areas exclusively above timberline in mountains; vegetation includes
 sedges, grasses, forbs, and willows**alpine complex**
- 4b Areas at mid- to high elevations below timberline and otherwise not
 as above.....**5**
- 5a Vegetation dominated by sedges or grass-like species.....
 **sedge meadow complex**
- 5b Vegetation dominated by perennial broad-leaved herbs over 30 cm
 tall in areas adjacent to forests**tall forb complex**
- 6a Vegetation developing along riparian habitats, such as streams, rivers,
 or intermittent washes**7**
- 6b Vegetation of uplands, mountain slopes, flats, or basins not associ-
 ated with riparian habitats.....**8**
- 7a Riparian vegetation below 2300 m; Frémont cottonwood, willows,
 and velvet ash are dominant.....**lower elevation riparian**
- 7b Riparian vegetation above 2300 m; narrowleaf cottonwood, thinleaf
 alder, red-osier dogwood, and willows are dominant
 **higher elevation riparian**
- 8a Shrub-dominated vegetation (clearly multistemmed at ground level)
 **9**
- 8b Tree-dominated vegetation**15**
- 9a Soils usually saline; sites in valley bottoms or broad plains; vegetation
 dominated by species of saltbush, winterfat, gray molly, and grease-
 wood **salt desert shrub complex**
- 9b Soils nonsaline; vegetation otherwise**10**
- 10a Sites at lower elevations (usually below 1100 m) in extreme south-
 western Utah; creosote bush, burrobush, Joshua tree, cholla, and
 blackbrush dominate..... **Mojave Desert complex**

10b	Sites other than low elevations in southwestern Utah	11
11a	Soils with shallow (less than 35 cm) calcium carbonate pans and sites receiving less than 25 cm of precipitation annually	12
11b	Soils without calcium carbonate pans or with pans more than 40 cm below the surface	13
12a	Dominant shrubs include black sagebrush, budsage, and snake-weed	xeric sagebrush complex
12b	Dominant shrubs are blackbrush, roundleaf buffaloberry, and green ephedra in south-central and eastern Utah	Colorado Plateau shrub complex
13a	Vegetation dominated by basin sagebrush, Wyoming sagebrush, mountain sagebrush, bluebunch wheatgrass, and Sandberg bluegrass	big sagebrush-grass complex
13b	Vegetation not dominated by sagebrush	14
14a	Plant cover dominated by tall shrubs (some species reaching over 2 m tall); woody species include Gambel oak, bigtooth maple, and serviceberry; plants occur north and east of Washington Co.	northern mountainbrush complex
14b	Plant cover dominated by Gambel oak and evergreen shrubby species, such as Dixie live-oak, Utah serviceberry, and manzanita	southern mountainbrush complex
15a	Dominant tree is Utah juniper	16
15b	Dominant trees are evergreen conifers other than juniper	17
16a	Codominant tree is a two-needle pinyon pine	eastern pinyon-juniper complex
16b	Codominant tree is a single-needle pinyon pine	western pinyon-juniper complex
17a	Dominant tree species is a three-needle pine (ponderosa pine), with Rocky Mountain juniper and greenleaf manzanita	ponderosa pine forest
17b	Dominant tree species are other than ponderosa pine	18
18a	Community dominated by Douglas fir	Douglas fir forest
18b	Dominant tree other than Douglas fir	19
19a	Mature forests dominated by Engelmann's spruce and subalpine fir; generally above 2500 m	spruce-fir forest
19b	Mature forests with some aspen trees and various coniferous species, such as white fir, blue spruce, Douglas fir, subalpine fir, and Engelmann's spruce	aspen-mixed conifer forest



and pinyon pine (either two-needle, or singleleaf) to expand their ranges into shrublands dominated by various sagebrush species, salt desert shrubs, or blackbrush.

Early reclamation efforts in Intermountain shrublands often sought the total eradication of shrubs and their replacement with adapted perennial grasses of good forage quality. Eventually, managers realized that the inclusion of desirable shrub species in reseeding mixes was advisable (USDA, Forest Service 1972). Shrubs contributed several desirable qualities to such revegetation efforts. First, shrubs tend to grow somewhat taller and to root more deeply than associated herbs. The taller stature of shrubs therefore results in a decreased loss of snow from exposed sites due to wind action and increased moisture for local plant growth. Deep rooting on steeper slopes also reduces the possibility of slope instability and slippage. Moreover, shrubs tend to retain succulent, more nutritious tissue aboveground longer than associated herbs during seasons unfavorable for growth, due to periodic drought or the onset of temperatures too cold for active plant growth. These qualities prolong the time that herbivores can survive on sites that are seasonally made unusable by severe drought or extreme cold.

Perhaps some of the most significant challenges for management of our woody landscapes are associated with the impacts of invasive

species. In riparian areas, tamarisk (*Tamarix chinensis*) and Russian olive (*Elaeagnus angustifolia*) have replaced native plant species such as cottonwoods and willows that are native to the area and provide habitat and food for many species. These exotic trees change the hydrology of streams by removing water (through transpiration) at rates much higher than those of the native species. The exotics also alter the relationships of herbivores and other species that have niches within native ecosystems. Extensive eradication programs targeted at these exotics—by burning, herbicides, and, more recently, biological controls—are in practice to restore plant species native to the state (Hultine et al. 2009).

Possibly the most significant threat to our shrublands is the invasion of cheatgrass (*Bromus tectorum* and *B. rubens*) (D'Antonio and Vitousek 1992). Cheatgrass density increases and supports fire in areas that have historically had only small, short-lived fires; thus plants there have evolved with very few adaptations for fire. Continued fires on such landscapes favor cheatgrass; fire cycles then increase; and cheatgrass thus continues to benefit at the expense of perennial grasses and shrubs native to these landscapes. In efforts to break the cycle cheatgrass creates, extreme and expensive efforts are currently underway to restore and rehabilitate native shrublands following fires. These programs include the use of herbicides, controlled burns followed by seeding of perennial grasses, and biological controls that include fungal pathogens (Meyer et al. 2008).

3

Key to Woody Plants of Utah

Using a dichotomous key requires choosing between a series of two contrasting statements that lead to a tentative identification of a plant, much like a game of 20 questions that allows you to find an answer through the process of elimination. The following set of keys is based primarily on the vegetative characteristics of average mature plants, rather than the flower characteristics typical of most identification keys. The keys may also include the habitat, elevation, geography, substrate, and distribution that is most descriptive for the species. In the majority of cases, there is no attempt to identify varieties within species in the keys; however, many varieties are included in the expanded descriptions that follow in Chapters Four and Five. Naturalized nonnative species are indicated by an asterisk (*).

To be successful in your attempts to use the keys, carefully observe the plant in question (a 10X hand lens may be necessary) and compare it with the first pair of descriptions (or couplet) at the very beginning of the key. Read both descriptions in their entirety and pick the alternative that best describes the plant in question. Then proceed to the next relevant pair of contrasting statements, as indicated by the number at the end of the alternative that you choose. Continue this process until you come to the name of the plant. This result, however, is a tentative identification, and it should be followed by a careful study of more extensive descriptions, illustrations, or photographs and by a comparison with a previously identified specimen (if available). There is a great deal of variation in the vegetative characteristics of plants that may be influenced

by environmental factors such as geography, habitat, soil, altitude, and grazing impacts. It is best if you can examine many specimens and determine what is most typical of the species. If, when keying a plant, you come to a couplet (or choice) that is difficult to determine, follow both routes at first until you can eventually eliminate one. For help with terminology, use the definitions and illustrations included in the glossary.

Major Group Key

- 1a Woody shrubs or trees with needle-like, scale-like, or awl-like leaves; usually evergreen; produce cones (gymnosperms)..... **Key I <pg #>**
- 1b Plants with leaves usually broad, occasionally needle- or scale-like, or lacking; some leaves modified as spines; stems usually woody, some succulent; produce flowers and fruits (angiosperms)**2**
- 2a Leaves arranged in basal rosettes of 10 or more, spear-like, grass-like, sometimes fleshy; flowers 3 merous (monocots) **Key II <pg #>**
- 2b Leaves usually not arranged in basal rosettes of 10 or more, not spear-like or grass-like, sometimes fleshy; leaves sometimes absent or modified as spines; flowers 4 or 5 merous (dicots).....**3**
- 3a Plants tree-like, usually more than 4 m tall at maturity; usually with a single trunk, occasionally multitrunked (if difficult to determine, try both ways)..... **Key III <pg #>**
- 3b Plants not tree-like, usually less than 4 m tall or vine-like.....**4**
- 4a Stems succulent, appearing leafless, more than 0.5 cm in diameter; leaves usually modified as spines (Cactaceae) **Key IV <pg #>**
- 4b Stems and leaves not as above**5**
- 5a Stems vine-like (vines).....**Key V <pg #>**
- 5b Plants shrubs and subshrubs, not vine-like **Key VI <pg #>**

Key I: Gymnosperms

- 1a Leaves usually scale-like or awl-like, usually less than 1.5 cm long. **2**
- 1b Leaves needle-like, usually more than 1.5 cm long**9**
- 2a (1a) Young stems green or blue green, broom-like, appearing leafless; branches rigid, terete, and striate; leaves opposite or in whorls, small, scale-like; plants not tree-like.....**3**
- 2b Young stems mostly covered with overlapping scale-like or awl-like leaves; leaves opposite or whorled; bark thin, shreddy or flaky; female cones berry-like; trees or shrubs**7**
- 3a (2a) Leaves three per node (Torrey's ephedra)
..... *Ephedra torreyana* <pg #>

- 3b Leaves usually two per node4
- 4a (3b) Base of leaves brown to black, conspicuous; leaves usually persistent; stems usually erect, broom-like; seeds usually paired, angled5
- 4b Base of leaves white, tan, or grayish, deciduous or persistent; stems often widely spreading; seeds solitary or paired, but not 3 angled...6
- 5a (4a) Stems often viscid, with sand often adhering to the stems; stems arising from the spreading rhizomes, often forming clumps; stalk of female cone up to 2.5 cm long; usually in sandy soils; mostly southeastern Utah (Cutler's ephedra).....*Ephedra viridis* var. *viscida* <pg #>
- 5b Stems not viscid; stems erect, broom-like; rhizomes lacking; stalk of female cone lacking or less than 2 mm long (green ephedra).....
.....*Ephedra viridis* var. *viridis* <pg #>
- 6a (4b) Leaf bases long, persistent, light brown turning gray or ashy; twigs branching at an angle of 30° or less, somewhat scabrous; stems green to light green, turning yellowish with age (young stems sometimes have a bluish glaucous tinge just above the nodes); female cone sessile or short stalked; seeds solitary, with longitudinal furrows, light brown or greenish; washes, dry rocky slopes, and sandy areas of the Virgin River drainage; 800–1100 m; Washington Co. (Mojave ephedra)
.....*Ephedra fasciculata* <pg #>
- 6b Leaf bases deciduous, tan or gray; twigs, branching at an angle of 45° or more; stems mostly bluish green, gray, to greenish, with a smooth glaucous covering, at least in the grooves; female cones usually stalked; seeds usually in pairs, smooth, brown; rocky hillsides, shrublands, and cliff faces; widespread in Utah; 850–2150 m (Nevada ephedra)*Ephedra nevadensis* <pg #>
- 7a (2b) Plants prostrate, shrub-like; both juvenile and mature leaves awl-like, usually in whorls of 3, spreading and jointed at the base, the upper surface with a whitish band; bark thin, papery, shredding, reddish brown; mature berry-like cones 6–9 mm in diameter, dark blue glaucous, sometimes persisting for 1 year or more (common juniper)
.....*Juniperus communis* <pg #>
- 7b Plants erect shrubs or trees, usually more than 2 m tall; leaves usually opposite, sometimes in threes, adult leaves scale-like, overlapping, appressed, only the juvenile leaves awl-like but not jointed at the base; berry-like cones 4–12 mm in diameter, brownish, blue, or purplish ..
.....8
- 8a (7b) Twigs slender, 1 mm or less in diameter, often drooping; trees usually dioecious, often more than 10 m tall; bark flaking; berry-like cones 4–6 mm in diameter, bluish to purple glaucous; 1525–2830 m (Rocky Mountain juniper)*Juniperus scopulorum* <pg #>

- 8b Twigs stout, 1–2 mm in diameter, not drooping; trees usually mon-
oecious, usually less than 5 m tall; sometimes with several upright
branches nearly the same size as the main stem; bark shredding into
long fibrous strips; cones 7–18 mm in diameter, bluish, glaucous,
becoming brownish with age; 850–2440 m (Utah juniper)
..... *Juniperus osteosperma* <pg #>
- 9a (1b) Base of the needles, particularly current growth, surrounded by a pa-
pery sheath; needles in bundles of 2 or more (occasionally 1); cone
scales thick, woody **10**
- 9b Base of the needles not surrounded by a sheath; needles attached
separately; cone scales thin, papery **15**
- 10a (9a) Needles solitary (occasionally 2), less than 6 cm long, sheath of the
needle deciduous; tree usually less than 15 m tall, often with 2 or 3
vertical branches; female cones 2–6 cm, with large edible wingless
seeds; common in pinyon-juniper communities in the Great Basin
(singleleaf pinyon) *Pinus monophylla* <pg #>
- 10b Needles in bundles of 2 or more **11**
- 11a (10b) Needles in bundles of 2 or 3 **12**
- 11b Needles in bundles of 5 **14**
- 12a (11a) Needles usually in bundles of 3 (occasionally 2), 10–25 cm long,
sheath persistent; tree 35–55 m tall; bark deeply furrowed, black-
ish when young, reddish brown at maturity, divided into irregular
plates, continually scaling off; cones 7–15 cm long; cone scales with
the prickle turned outward; seeds with a prominent wing (ponderosa
pine) *Pinus ponderosa* <pg #>
- 12b Needles usually in bundles of 2, less than 10 cm long, otherwise not
as above in all ways **13**
- 13a (12b) Mature tree usually less than 15 m tall, the crown often as wide as
tall, the trunk short; needles 2–5 cm long; bundle sheath usually de-
ciduous after second year; female cone oval, 2–5 cm long, without
prickles; seeds large, wingless; 1200–2750 m (two-needle pinyon
pine) *Pinus edulis* <pg #>
- 13b Mature tree up to 35 m tall; main stem straight, without large side
branches; needle sheath persistent; needles 2–9 cm long, often
twisted; cones lopsided, persistent, 2–5 cm, with prickles; seeds
small, winged; 2100–3400 m (lodgepole pine)
..... *Pinus contorta* <pg #>
- 14a (11b) Needles 2–4 cm long; bundle sheaths sometimes persistent for 2–3
years; cones 5–9 cm long; cone scales with bristles; trees often gnarled
and bushy; branches often drooping, twisted; mainly on limestone
substrate; 2195–3265 m (bristlecone pine) *Pinus longaeva* <pg #>

- 14b Needles 3–7 cm long; bundle sheath falling off, usually after one season; cones 7–20 cm long, cone scales without bristles; trees sometimes shrub-like in high exposed windy environments; young twigs slender, flexible; 1830–3450 m (limber pine) ***Pinus flexilis* <pg #>**
- 15a (9b) Needles 4 angled in cross section, sharp pointed; branches very rough from the persistent leaf bases; cones pendent, papery, and intact at maturity **16**
- 15b Needles more or less flattened, tips not sharp; branches somewhat smooth where needles have fallen; cones erect to pendent **17**
- 16a (15a) Young twigs usually pubescent; needles 1.5–2.5 cm long, not painfully sharp; trees up to 40 m tall, sometimes growing low and shrubby at timberline; bark thin, scaly; cones usually less than 6 cm; often growing with subalpine fir; 2440–3420 m or at timberline (Engelmann spruce) ***Picea engelmannii* <pg #>**
- 16b Young twigs glabrous; needles usually more than 2 cm long, very sharp to the touch; bark thick, furrowed; cones usually more than 6 cm long; usually along moist canyon bottoms; 1800–2900 m (blue spruce) ***Picea pungens* <pg #>**
- 17a (15b) Needles arise from slightly raised oval leaf scars, narrow at the base; point of attachment less than 1 mm wide; buds reddish brown, sharp pointed; seed cones pendant, with persistent cone scales; cone scales with conspicuous 3-pointed bracts (Douglas fir) ***Pseudotsuga menziesii* <pg #>**
- 17b Needles arise from flat circular scars, the point of attachment at least 1 mm wide; buds light brown to whitish, blunt; seed cones erect, the scales deciduous at maturity, the slender axis of the cone sometimes persisting for several years **18**
- 18a (17b) Longest needles on the lower branches usually less than 3 cm long, often erect; branchlets pubescent; trees spire shaped, sometimes shrub-like at timberline; male cones bluish; seed cones dark purple; often growing with Engelmann's spruce; 2400–3400 m (subalpine fir) ***Abies lasiocarpa* <pg #>**
- 18b Longest needles on the lower branches more than 3 cm long, in flat sprays or erect; branchlets glabrous; trees often with a cone-like to rounded crown; male cones rose to dark red; seed cones olive green; 1500–3100 m (white fir) ***Abies concolor* <pg #>**

Key II: Monocot Trees and Shrubs

- 1a Leaves with lateral teeth and a terminal spine, the leaves curving inward at the tip; flowers yellow; ovary inferior; 1000–2025 m; Washington Co. (Utah century plant) ***Agave utahensis* <pg #>**

- 1b Leaves without lateral teeth, with or without a spine, the leaves not curving inward at the tip; flowers white; ovary superior.....2
- 2a (1b) Leaf apex fibrous, a terminal spine lacking; flowers less than 1 cm long, not succulent; 1450–1525 m; Washington Co. (beargrass)*Nolina microcarpa* <pg #>
- 2b Leaf apex with a stout spine; leaves with tough fibrous margins, often stringy; flowers 3 cm or more long, usually succulent3
- 3a (2b) Plants tree-like, with well-defined erect stems; leaf rosettes at the branch tips; Beaver Dam Mountains, Washington Co.4
- 3b Plants not particularly tree-like; stems, if present, short and usually decumbent; rosettes basal5
- 4a (3a) Plants 1–12 m tall; leaves usually less than 3 dm long; margins thin, finely serrate, not fibrous; inflorescence a compact panicle, 2–5 dm long; fruit dry and spongy at maturity; Beaver Dam Mountains, Washington Co. (Joshua tree) *Yucca brevifolia* <pg #>
- 4b Plants 1–5 m tall; leaves 3–15 dm long, margins thick, with coarse curved fibers; inflorescence paniculate, 5–13 dm long, mostly contained within the foliage; fruit fleshy at maturity; rare; lower slopes of the Beaver Dam Mountains, Washington Co. (Mojave yucca)..... *Yucca schidigera* <pg #>
- 5a (3b) Leaves usually more than 20 mm wide, concavo-convex, rigid, often bluish green6
- 5b Leaves usually less than 20 mm wide, plano-convex or concavo-convex, flexible to somewhat rigid.....7
- 6a (5a) Longest leaves up to 1 m long and 6 cm wide; inflorescence paniculate, remaining completely within the rosette of leaves or extending 1/4 beyond; fruit indehiscent, fleshy (datil yucca)..... *Yucca baccata* <pg #>
- 6b Longest leaves up to 0.5 m long and to 4 cm wide; inflorescence racemose (rarely paniculate proximally), arising from within the rosette of leaves to well beyond the rosette; fruit dehiscent, dry (Harriman’s yucca)..... *Yucca harrimaniae* <pg #>
- 7a (5b) Leaves concavo-convex, usually stiff and rigid, less than 5 dm long and 0.5–4.3 cm wide, usually widest near the middle, lanceolate to lanceolate-spatulate, falcate, or straight; inflorescence arising within the rosette of leaves; peduncle less than 3 dm long; fruit constricted (Harriman’s yucca)..... *Yucca harrimaniae* <pg #>
- 7b Leaves plano-convex, flexible to somewhat rigid, mostly linear; other characters may vary.....8
- 8a (7b) Leaves 3–8 mm wide; inflorescence arising within the rosette of leaves; peduncle 1–2 dm long; capsules not constricted, or only slightly so; southeastern Utah; 1200–2200 m (Bailey’s yucca) *Yucca baileyi* <pg #>

- 8b Leaves 4–20 mm wide; inflorescence arising from near the top or well beyond the rosette; peduncle 3–25 dm long; capsules vary in the degree of constriction.....**9**
- 9a (8b) Inflorescence paniculate; plants caulescent, stems procumbent, to 1.3 m long; peduncle 2.5–4.5 cm in diameter; fruits not or only slightly constricted; sandy soils, Washington Co. (Utah yucca) ***Yucca utahensis* <pg #>**
- 9b Inflorescence usually racemose, occasionally paniculate; plants acaulescent or short caulescent; peduncle 1–2 cm in diameter; capsules deeply to moderately constricted**10**
- 10a (9b) Inflorescence and peduncle usually less than 1.5 m long; leaves to 50 cm long, flexible; capsules usually less than 5 cm long, deeply constricted (narrow leaf yucca) ***Yucca angustissima* var. *angustissima* <pg #>**
- 10b Inflorescence and peduncle more than 1.5 m long; leaves to 80 cm long, somewhat stiff; capsules 4–7.5 cm long, moderately constricted**11**
- 11a (10b) Peduncle greatly surpassing the leaves; stem erect; flowers less than 5.2 cm long; sandstone outcrops and hanging gardens along the Glen Canyon and San Juan arms of Lake Powell and the southern portion of the Kaiparowits Plateau in Garfield, Kane, and San Juan cos. (Toft's yucca) ***Yucca angustissima* var. *toftiae* <pg #>**
- 11b Peduncle short, lower part of the inflorescence usually included among the leaves; stem procumbent; flowers more than 5.5 cm long; sandy soils; western Kane and eastern Washington cos. (common in the Coral Pink Sand Dunes) (Kanab yucca) ***Yucca angustissima* var. *kanabensis* <pg #>**

Key III: Dicot Trees

- 1a Leaves opposite.....**2**
- 1b Leaves alternate or whorled.....**7**
- 2a (1a) Leaves simple.....**3**
- 2b Leaves compound**5**
- 3a (2a) Leaves pinnately veined; young stems angular (singleleaf ash)..... ***Fraxinus anomala* <pg #>**
- 3b Leaves palmately veined**4**
- 4a (3b) Leaves glabrous on both sides, 2–8 cm wide, lobes sharply doubly serrate, with acute tips and sinuses; petioles often red (Rocky Mountain maple)..... ***Acer glabrum* <pg #>**
- 4b Leaves usually hairy on the lower surface, at least on the veins, up to 13 cm wide, the lobes entire, or with a few coarse teeth, the tips and sinuses rounded (bigtooth maple)..... ***Acer grandidentatum* <pg #>**

- 5a (2b) Leaves palmate, glabrous on both sides; leaflets 3, sessile (Rocky Mountain maple) **Acer glabrum <pg #>**
- 5b Leaves pinnate, more or less hairy, at least on the lower surface; leaflets 3–9, stalked **6**
- 6a (5b) Leaflets usually elliptic, less than 5 cm long and 3 cm wide; twigs marked with heart-shaped leaf scars; fruit with a single symmetrical wing; Kane and Washington cos. (velvet ash)
..... **Fraxinus velutina <pg #>**
- 6b Leaflets irregularly lobed or toothed, usually more than 5 cm long and 3 cm wide; fruit (a double samara) with a single wing offset to one side; widespread (boxelder) **Acer negundo <pg #>**
- 7a (1b) Leaves compound **8**
- 7b Leaves simple **15**
- 8a (7a) Stems armed with spines **9**
- 8b Stems lacking spines **12**
- 9a (8b) Spines curved, internodal; legumes flattened, oblong, and constricted between the seeds (catclaw acacia) **Acacia greggii <pg #>**
- 9b Spines straight, nodal; legumes flattened or spirally coiled **10**
- 10a (9b) Leaves once pinnate, leaflets oval; twigs hairy; stems with large heart-shaped leaf scars; fruit glandular hairy (New Mexico locust)
..... **Robinia neomexicana <pg #>**
- 10b Leaves twice pinnate, with 2 primary divisions; fruit lightly pubescent but not glandular **11**
- 11a (10b) Leaflets in 8–18 pairs, sometimes more than 1 cm long; trunk usually branching at ground level; pods narrowly oblong, compressed laterally, and not coiled into a woody cylinder (honey mesquite) **Prosopis glandulosa <pg #>**
- 11b Leaflets in 5–8 pairs, usually less than 1 cm long; trunk usually erect; pods coiled into a woody cylinder (screwbean mesquite)
..... **Prosopis pubescens <pg #>**
- 12a (8b) Leaves trifoliate; twigs glabrous, pale green to white; fruit consisting of a seed surrounded by a thin broad wing (hoptree)
..... **Ptelea trifoliata <pg #>**
- 12b Leaves with more than 3 leaflets **13**
- 13a (12b) Leaflets 7–13, serrate, 2–9 cm long; small trees to 4 m; lenticels conspicuous; fruit a small orange pome, 5–10 mm in diameter (Rocky Mountain ash) **Sorbus scopulina <pg #>**
- 13b Leaflets entire to subentire or slightly lobed **14**
- 14a (13b) Leaflets usually less than 10; fruit a red drupe, 4–8 mm thick (atlas pistachio) **Pistacia atlantica* <pg #>**

- 14b Leaflets usually more than 10; fruit a linear to oblong samara (tree-of-heaven) *Ailanthus altissima** <pg #>
- 15a (7b) Plants armed with thorns.....**16**
- 15b Plants not armed with thorns.....**21**
- 16a (15a) Leaf blades entire, with silvery scales on the underside; lenticels inconspicuous (Russian olive).....*Elaeagnus angustifolia** <pg #>
- 16b Leaf blades with irregular and/or coarsely toothed margins, lacking silvery scales; lenticels somewhat conspicuous on younger twigs..**17**
- 17a (16b) Thorns usually 1–3 cm long; leaves usually 1.5–4 times longer than wide, the upper 1/2 finely toothed but not particularly lobed; petioles often have a pair of raised glands; mature pome dark purple to black (if confusing, try both routes).....**18**
- 17b Thorns usually more than 3 cm long; leaves usually 1.5–2 times longer than wide, the upper 1/2–2/3 deeply toothed to somewhat lobed; petioles may or may not have glands but do not occur as a single pair; mature pome red, orange, or brown.....**20**
- 18a (17a) Mature leaf blades often more than 2 times longer than wide; fruits 6–8 mm wide; plants of the Uinta Basin (Duchesne hawthorn)*Crataegus douglasii* var. *duchesnensis* <pg #>
- 18b Mature leaf blades usually less than 2 times longer than wide; fruits 8–12 mm wide; widespread (river hawthorn)
..... *Crataegus douglasii* var. *rivularis* <pg #>
- 19a (17b) Petioles, at least some have stalked, red glands; leaf serrations have red-tipped glands; Cache Co. (fireberry hawthorn)
.....*Crataegus chrysocarpa* <pg #>
- 19b Petioles lack stalked, red glands; glands if present on the leaf serrations, are not conspicuous.....**21**
- 20a (17b) Leaves pubescent on both surfaces; pome dark red; dry gravel slopes in Provo Canyon, Utah Co. (red hawthorn).....
..... *Crataegus columbiana* <pg #>
- 20b Leaves sparsely pubescent above, glabrous below; pome orange red to dark brown; stream banks and canyon slopes, LaSal Mountains, San Juan Co. (Rocky Mountain hawthorn)
..... *Crataegus erythropoda* <pg #>
- 21a (15b) Leaves lobed or pinnatifid**22**
- 21b Leaves serrate, crenate, or entire**27**

22a (21a)	Leaves and branchlets with glands, the leaves usually 5 lobed; bark shreddy; fruit a plumose achene (cliffrose)..... <i>Purshia stansburyana</i> <pg #>
22b	Leaves lacking glands; fruit an acorn 23
23a (22b)	Leaf lobes with spiny tips; Kane, San Juan, and Washington cos. (Dixie live-oak)..... <i>Quercus turbinella</i> <pg #>
23b	Leaf lobes without spiny tips (<i>Q. turbinella</i> hybrids occasionally with some spiny tips) 24
24a (23b)	Leaves up to 5.5 cm long and to 3.3 cm wide, both sides similar in color when mature, with 6–10 tooth-like lateral lobes, the tips apiculate to acuminate; sandy soils of Emery, Garfield, Grand, Kane, San Juan, and Wayne cos.; 1125–2135 m (Havard oak).... <i>Quercus havardii</i> <pg #>
24b	Leaves larger than above, mature leaves slightly paler below; plants not usually in sandy soils..... 25
25a (24b)	Leaf sinuses not obliquely descending; leaves with 4–8 tooth-like lateral lobes, usually sharp pointed; semi-evergreen; western Utah (hybrid) <i>Quercus gambelii</i> × <i>Q. turbinella</i> <pg #>
25b	Leaf sinuses obliquely descending 1/4–3/4 the distance to the midrib, sometimes more..... 26
26a (25b)	Largest leaves up to 17 cm long, the sinuses 1/4–3/4 or more the distance to the midrib, the lobes rounded, obtuse, or bilobed; deciduous; all Utah counties (Gambel oak) <i>Quercus gambelii</i> <pg #>
26b	Largest leaves up to 8.5 cm long, the sinuses less than 1/2 the distance to the midrib; semi-evergreen; Garfield, Grand, Kane, and San Juan cos. (hybrid) <i>Quercus gambelii</i> × <i>Q. havardii</i> <pg #>
27a (21b)	Branchlets deciduous; leaves scale-like, sessile, somewhat appressed, 1–3 mm long, less than 0.5 mm wide; long slender branches, with reddish-brown bark; flowers pink to white; forms thickets along stream courses, lakes, ditch banks, etc. in desert habitats, usually below 2300 m; widespread (tamarisk)..... <i>Tamarix chinensis</i> <pg #>
27b	Branchlets not deciduous, leaves not scale-like 28
28a (27b)	Mature leaf blades usually more than 3 times longer than wide (if difficult to determine, try both ways) 29
28b	Mature leaf blades usually less than 4 times longer than wide..... 37
29a (28a)	Leaves sessile, the upper leaves irregularly alternate, the lower leaves sometimes opposite; along washes and streams below 1500 m; Washington Co. (desert willow)..... <i>Chilopsis linearis</i> <pg #>
29b	Leaves petiolate..... 30

- 30a (29b) Plants evergreen; leaves firm, leathery, strongly revolute, and often fascicled; fruit a plumose achene; arid slopes and rocky outcrops (curl-leaf mountain mahogany)..... ***Cercocarpus ledifolius* <pg #>**
- 30b Plants deciduous; leaves not as above; usually in moist habitats....**31**
- 31a (30b) Plants usually multistemmed**32**
- 31b Plants usually with a single trunk**34**
- 32a (31a) Mature leaves not glaucous; wart-like glands on the upper surface and near the base of the leaf; stipules often well developed (whiplash willow).....***Salix lucida* <pg #>**
- 32b Mature leaves glaucous below**33**
- 33a (32b) Mature leaves glabrous, usually lanceolate to elliptic; widespread (graybark willow)***Salix eriocephala* <pg #>**
- 33b Mature leaves pubescent, at least on one side, usually oblong to oblanceolate; western Utah (arroyo willow)***Salix lasiolepis* <pg #>**
- 34a (31b) Leaf buds covered by several strongly resinous scales; petioles dorso-ventrally compressed (narrowleaf cottonwood)
.....***Populus angustifolia* <pg #>**
- 34b Leaf buds covered by a single nonresinous scale; petioles not dorsal-ventrally compressed.....**35**
- 35a (34b) Twigs easily broken from the branches; margins of the bud scales cap-like, not split down the side; introduced, common in northern and central Utah (crack willow)***Salix fragilis** <pg #>**
- 35b Twigs not easily broken from the branches; margins of the bud scales split down the side, with free overlapping margins; southern Utah **36**
- 36a (35b) Leaves glaucous beneath; twigs densely pubescent, at least at the nodes; San Juan and Washington cos. (red willow)***Salix laevigata* <pg #>**
- 36b Leaves not glaucous; twigs glabrous, yellow (black willow).....
.....***Salix gooddingii* <pg #>**
- 37a (28b) Leaf margins usually doubly serrate or irregularly toothed, sometimes slightly lobed**38**
- 37b Leaf margins regularly serrate, entire, crenate, or dentate**41**
- 38a (37a) Plants usually with more than 1 trunk; bark reddish, with conspicuous lenticels (western river birch)***Betula occidentalis* <pg #>**
- 38b Plants with a single trunk; bark grayish, the lenticels not conspicuous.....**39**
- 39a (38b) Leaves arising from two sides of the stem (2-ranked), often slightly oblique at the base (Siberian elm)***Ulmus pumila** <pg #>**
- 39b Leaves not 2-ranked, not oblique at the base.....**40**

- 40a (39b) Petioles more than 1 cm long, somewhat orange; twigs minutely pubescent, glandular; seeds in a woody cone-like structure; buds stalked; widespread (thinleaf alder) ***Alnus incana* <pg #>**
- 40b Petioles less than 1 cm long; twigs spreading hairy, more or less stipitate glandular, becoming glabrous; seeds in a papery cone-like structure; buds sessile; sandstone canyons in southeastern Utah (western hophornbeam) ***Ostrya knowltonii* <pg #>**
- 41a (37b) Side veins conspicuous, more or less parallel to each other; mature leaves usually coarsely serrate to entire, or serrate distally and entire toward the base..... **42**
- 41b Side veins usually not particularly conspicuous or parallel to each other; leaves usually entire or crenate, sometimes serrulate or somewhat serrate..... **45**
- 42a (41a) Petiole not distinct; leaf base cuneate; fruit a plumose achene (alder-leaf mountain mahogany)..... ***Cercocarpus montanus* <pg #>**
- 42b Petiole distinct; leaf base asymmetric or rounded; fruit a samara or pome **43**
- 43a (42b) Leaves occurring in 2 vertical rows along the stem (2-ranked); leaf base asymmetric; fruit a samara (Siberian elm) ***Ulmus pumila** <pg #>**
- 43b Leaves not 2-ranked; leaf base rounded or sometimes acute; fruit a reddish to blackish pome **44**
- 44a (43b) Leaves usually more than 2.5 cm long; typical of montane habitats (serviceberry) ***Amelanchier alnifolia* <pg #>**
- 44b Leaves usually less than 2.5 cm long; typical of desert and foothill habitats (Utah serviceberry)..... ***Amelanchier utahensis* <pg #>**
- 45a (41b) Leaf blades nearly as wide or wider than long..... **46**
- 45b Leaf blades longer than wide..... **48**
- 46a (45a) Petioles not flattened; leaves palmately veined, cordate to reniform; leaf margins entire; older bark smooth, gray (western redbud) ***Cercis occidentalis* <pg #>**
- 46b Petioles flattened perpendicular to the blade; not as above in all characters **47**
- 47a (46b) Leaves deltoid, with crenate or serrulate margins; older bark dark, fissured; generally along waterways; lower elevations (Fremont cottonwood) ***Populus fremontii* <pg #>**
- 47b Leaves ovate to reniform cordate, with subentire to serrate or serrulate margins; older bark white, with a powdery bloom, and black where damaged; trees clonal; above 1400 m in all Utah counties (quaking aspen) ***Populus tremuloides* <pg #>**

- 48a (45b) Leaves often fascicled; plant usually less than 40 dm tall; twigs with thin reddish bark; longest leaves less than 5 cm long, usually oblanceolate, obovate, or oblong, the margins crenate, often with glandular hairs in the sinus; Pine Valley Mountains, Washington Co. (bitter cherry) ***Prunus emarginata* <pg #>**
- 48b Plants other than above in most characters.....**49**
- 49a (48b) Petioles 1–2 cm long, with 2 glands near the base of the leaf; twigs and branches commonly infected with a fungus (black-knot canker) (chokecherry) ***Prunus virginiana* <pg #>**
- 49b Plants other than above.....**50**
- 50a (49b) Leaves with an oblique base, the upper surface leathery and rough, a conspicuously reticulate vein pattern below; bark rough, with corky ridges; often in dry sites (netleaf hackberry) ***Celtis reticulata* <pg #>**
- 50b Plants not as above; usually in riparian or moist habitats.....**51**
- 51a (50b) Leaf buds with several overlapping scales, often resinous; leaves ovate.....**52**
- 51b Leaf buds with a single scale, not resinous; leaves obovate to oblanceolate or elliptic to lanceolate**53**
- 52a (51a) Leaf blades darker above than below, the leaf tip acute acuminate, the base cuneate to cordate; leaf margins crenulate (black cottonwood) ***Populus trichocarpa* <pg #>**
- 52b Leaf blades yellow green on both sides, the leaf tip acute, the base rounded; leaf margins finely to coarsely serrate (lanceleaf cottonwood) ***Populus xacuminata* <pg #>**
- 53a (51b) Small trees, with 1 or few stems; year-old branchlets yellowish to ashy gray; mature leaves usually lanceolate to ovate, usually glabrous, with acuminate tips; petioles slender, with a tendency to droop; buds scales with free overlapping margins; widespread; 1070–1800 m (peachleaf willow)..... ***Salix amygdaloides* <pg #>**
- 53b Usually multistemmed, occasionally small trees; leaves elliptic, ovate, or obovate, usually with some pubescence on the underside of the leaf; bud scales without free margins; widespread**54**
- 54a (53b) Twigs of the new season usually appressed hairy; bark of older branches white-streaked from the cracked bark; year-old twigs reddish brown or reddish purple; mature buds with depressed margins (like a duck's beak in profile); leaves mostly elliptical, sometimes ovate or obovate (Bebb's willow)..... ***Salix bebbiana* <pg #>**

- 54b Twigs of the new season with widely spreading hairs; freshly stripped bark with a skunk-like odor; year-old twigs reddish brown to pale green or yellow; leaves usually obovate or oblanceolate, occasionally elliptic, sometimes with minute, rust-colored hairs on the underside (Scouler's willow) ***Salix scouleriana* <pg #>**

Key IV: Cactus Family

- 1a Areoles with glochids and, usually, with 1 or more spines; stems jointed, either cylindrical or flattened when mature; new stems sometimes with fleshy, terete leaves below each areole; leaves soon deciduous **2**
- 1b Areoles lacking glochids, but with spines; stems not jointed, cylindrical to globose..... **15**
- 2a (1a) Stem segments (joints) cylindrical or clavate..... **3**
- 2b Stem segments flattened (after an initial cylindrical stage)..... **6**
- 3a (2a) Joints clavate, 1 to few aboveground; plants occur in clumps less than 2 dm tall and 1 dm wide, arising from tuberous underground stems; spine sheaths not deciduous, or only at the tips; Box Elder, Juab, Mil-lard, and Tooele cos. (sand club-cholla)... ***Grusonia pulchella* <pg #>**
- 3b Joints cylindrical; plants usually more than 2 dm tall, not arising from a tuberous underground stem; spine sheaths deciduous; southern Utah **4**
- 4a (3b) Trunk absent; fruits fleshy at maturity; stem segments up to 15 cm long and 2.2 cm wide; up to 10 spines per areole; flowers yellow-green; in desert shrub, grassland, or pinyon-juniper, Washington Co., southern parts of the Great Basin, and the Colorado Plateau up to 1895 m (Whipple's cholla) ***Cylindropuntia whipplei* <pg #>**
- 4b Trunk present; fruits dry at maturity; below 1375m..... **5**
- 5a (4b) Tubercles 1–2 times longer than wide; terminal joints usually less than 12 cm long; tepals greenish yellow, the outer ones sometimes suffused reddish; Washington Co. (silver cholla or golden cholla)..... ***Cylindropuntia echinocarpa* <pg #>**
- 5b Tubercles more than 2 times longer than wide; terminal joints 12–50 cm; outer tepals greenish yellow to brownish, inner tepals yellow to reddish orange; Washington Co. (buckhorn cholla)..... ***Cylindropuntia acanthocarpa* <pg #>**
- 6a (2b) Stem segments usually spineless or if introgressed, with one or more spines..... **7**
- 6b Stem segments usually with spines (occasionally a species that typically has spines will have more or less spineless forms)..... **9**

- 7a (6a) Stems decumbent to trailing, elliptical to obovate; 7–11 areoles per diagonal row across the midstem segment, occasionally with a single spine in a few distal areoles; flowers yellow or various other hues if crossed or introgressed, stigmas green; Kane and Washington cos. (Pipe Springs cactus) ***Opuntia aurea* <pg #>**
- 7b Stems erect, cordate to obovate; usually more than 10 areoles per diagonal row; flowers pink, stigmas white; Emery, Garfield, Kane, San Juan, and Washington cos. **8**
- 8a (7b) Stems cordate to obovate, glaucous; usually more than 10 areoles per diagonal row across the midstem segment; San Juan and Washington cos. (beavertail pricklypear)... ***Opuntia basilaris* var. *basilaris* <pg #>**
- 8b Stems usually obovate, not always glaucous; areoles usually less than 10 per diagonal row across the midstem segment; Emery, Garfield, San Juan, and Wayne cos. (Heil's beavertail) ***Opuntia basilaris* var. *heilii* <pg #>**
- 9a (6b) Mature plants usually less than 5 dm tall; fruits dry or fleshy **10**
- 9b Mature plants more than 5 dm tall; fruits fleshy **13**
- 10a (9a) Terminal stem segments sometimes easily detached; 3–5 areoles per diagonal row; stem segments 6 cm long or less and sometimes up to 1/2 as thick as wide, the stem segments thus narrowly obovate rather than flat; plants often forming low mats; flowers usually yellow, or rarely pink (when hybridized); fruits dry (brittle pricklypear) ..
..... ***Opuntia fragilis* <pg #>**
- 10b Terminal stem segments not easily detached; 4–14 areoles per diagonal row; stem segments more than 6 cm long, flat; plants not forming low mats; fruits dry or fleshy..... **11**
- 11a (10b) Stems cross-wrinkled when water stressed, laying down in winter; 5–6(8) areoles per diagonal row; flowers yellow, with red bases; fruits fleshy; sporadic in Utah, foothills of Davis and Salt Lake cos. reported but questionable or rare in Kane and Washington cos. (plains pricklypear)..... ***Opuntia macrorhiza* <pg #>**
- 11b Stems not cross-wrinkled when water stressed, not laying down in winter, though they sometimes droop; 4–14 areoles per diagonal row; flower color various, but usually uniform throughout; fruits dry..... **12**
- 12a (11b) Areoles in the distal 1/3 of the stem segment bearing 0–4 spines; glochids conspicuous; (4)7–8 areoles per diagonal row; flowers pink; Kane and Washington cos. (Pinkava's pricklypear).....
..... ***Opuntia pinkavae* <pg #>**
- 12b Areoles in the distal 1/3 of the stem segment usually bearing 6–20 spines (some forms occasionally spineless); glochids inconspicuous; 6–14 areoles per diagonal row; flower color various; widespread (pricklypear)..... ***Opuntia polyacantha* <pg #>**

- 13a (9b) Plants erect or mainly so, with a spiny trunk; stem segments orbiculate to broadly obovate, less than 20 cm long; spines predominantly round in cross section, though sometimes elliptical near the base; areoles 7–10 per diagonal row; spines yellow, deflexed except in the margins of the stem segment; glochids yellow, conspicuous; Washington Co. (silver dollar cactus) ***Opuntia chlorotica* <pg #>**
- 13b Plants spreading to trailing; stem segments usually obovate or sometimes suborbiculate, less than 40 cm long; spines flattened or angular in cross section, most strongly at the base, covering most of the stem segment or only in the distal areoles; plants of southern half of the state **14**
- 14a (13b) Plants with stem segments less than 40 cm long; spines white, but usually red to brown at the extreme bases; flowers yellow; fruits dark red, vase shaped, and thick fleshed, with a small seed cavity; Washington Co. in and near Zion National Park (Engelmann's pricklypear) ***Opuntia engelmannii* <pg #>**
- 14b Plants with stem segments less than 25 cm long; spines brown to white or partly to wholly gray to tan; flowers yellow with red bases, or various hues from yellow to pink; fruits dark red to orange red, barrel shaped, and thin walled, with a large seed cavity; southern half of Utah (brown-spined pricklypear) ***Opuntia phaeacantha* <pg #>**
- 15a (1b) Stems not ribbed **16**
- 15b Stems ribbed or tubercles somewhat coalescent into ribs **23**
- 16a (15a) Spines with at least 1 hook (little fishhook cactus) ***Mammillaria tetrancistra* <pg #>**
- 16b Spines hookless (except in *S. brevispinus* and *S. wetlandicus*) **17**
- 17a (16b) Tubercles grooved on the upper side; flowers and spines borne on separate areoles **18**
- 17b Tubercles not grooved on the upper side; flowers and spines borne on the same areole **20**
- 18a (17a) Stems deep set into the substrate, often nearly subterranean, except during the growing season; spines 6–21 per areole; in cool desert shrub, pinyon-juniper, and ponderosa pine communities; very rare in Utah, Garfield Co. (Missouri pincushion) ***Coryphantha missouriensis* <pg #>**
- 18b Stems usually not deep set, more than 1/2 aboveground; spines 10–75 per areole **19**
- 19a (18b) Stems single or forming clumps, up to 20 cm tall; central spines appressed to projecting, not noticeably convergent at apex; flowers wide open, bright pink; plants of medium elevations; widespread over much of the state in the Great Basin and Colorado River drainages (pincushion cactus) ***Coryphantha vivipara* <pg #>**

- 19b Stems usually single, to 15 cm tall; some central spines ascending, noticeably converging over plant apex; flowers not opening wide, pale yellow to pale apricot, with well-defined darker midstripes; western Washington Co. (Mojave pincushion) ***Coryphantha chlorantha* <pg #>**
- 20a (17b) Central spines lacking; endemic to Emery and Wayne cos.....**21**
- 20b Central spines present; distribution not as above**22**
- 21a (20a) Areoles densely woolly, rarely glabrate; longest lateral spines up to 4 mm long or absent; flowers peach or pink (Winkler's cactus)..... ***Pediocactus winkleri* <pg #>**
- 21b Areoles sometimes villous, but not woolly; longest lateral spines up to 6 mm long; flowers yellow bronze to peach bronze. (Despain's cactus) ***Pediocactus despainii* <pg #>**
- 22a (20b) Central spines long and stout (13–30 mm long); areoles circular, white, woolly; gypsiferous soils in salt desert shrub; 900–1590 m; Kane and Washington cos. (Siler's cactus) ***Pediocactus sileri* <pg #>**
- 22b Central spines short and fine, less than 15 mm long; areoles elliptic to subcircular; shadscale, mixed desert shrub, pinyon-juniper, or Douglas fir; 1460–2830 m (Simpson's cactus) ***Pediocactus simpsonii* <pg #>**
- 23a (15b) Central spines not hooked on most plants, (except in *Sclerocactus brevispinus* and *S. wetlandicus*); plants becoming cylindric or not **24**
- 23b At least one of the central spines hooked, plants becoming at least short cylindric in age.....**29**
- 24a (23a) Plants usually solitary; stems largely obscured by the spines, with a short woolly groove running to the axil; ribs inconspicuous, usually 21; tubercles protrude above the ribs; flowers pink or, less often, yellow and blotched with maroon at the base; Washington Co. (Johnson's little barrel cactus) ***Echinomastus johnsonii* <pg #>**
- 24b Plants solitary or forming clumps; stems usually not largely obscured by the spines, lacking a short woolly groove; ribs commonly 8–14, well defined in mature plants; flowers lacking a maroon blotch at the base; distribution various.....**25**
- 25a (24b) Stems cylindric; spines never hooked; flowers and fruits located away from the apex and bursting the epidermis on the side of the plant; fruit spiny and fleshy at maturity; distribution various**26**
- 25b Stems depressed globose to cylindric; spines mostly straight, but some occasionally hooked; flowers and fruits borne from the stem apex; fruit dry at maturity; Carbon, Duchesne, and Uintah cos.....**28**

26a (25a)	Stems few to numerous, in a compact flat or hemispheric cluster; up to 14 ribs; spines not conspicuously of different light and dark colors; flowers scarlet to orange..... 27
26b	Stems 1 to several or occasionally many, loosely clustered; 10–13 ribs; spines conspicuously of different light and dark colors; flowers pink; Beaver, Garfield, Juab, Kane, Millard, San Juan, Tooele, Washington, and Wayne cos. (pink-flowered hedgehog cactus)..... <i>Echinocereus engelmannii</i> <pg #>
27a (26a)	Spines 5–11 per areole; flowers perfect, usually more than 4 cm long, scarlet; widespread in central and southern Utah; below 3000 m (Mojave hedgehog) <i>Echinocereus mojavensis</i> <pg #>
27b	Spines 7–19 per areole; flowers unisexual, scarlet, orange, or yellowish; Zion National Park area in Washington Co.; below 3000 m (scarlet hedgehog cup) <i>Echinocereus coccineus</i> <pg #>
28a (25b)	Stems depressed globose, never cylindric; ribs 13; plants commonly with a very short (1 mm) straight central spine and hooks only if introgressed with <i>Sclerocactus wetlandicus</i> ; flowers pale pink; desert flats and near washes in Duchesne and Uintah cos. (shortspined cactus)..... <i>Sclerocactus brevispinus</i> <pg #>
28b	Stems cylindric at maturity; ribs usually 12–14; some plants with hooked spines, more often at the southern edge of the distribution range; flowers pale pink or darker pink; desert mesas and hills in Carbon and Uintah cos. (Ouray little barrel cactus) .. <i>Sclerocactus wetlandicus</i> <pg #>
29a (23b)	Largest spines annulate ridged, usually not strongly hooked; plants usually solitary; stems up to 15 dm tall; ribs 20–32; Washington Co. (red barrel cactus) <i>Ferocactus cylindraceus</i> <pg #>
29b	Largest spines not annulate ridged, at least 1 spine strongly hooked; plants solitary or forming clumps; stems commonly up to 2.3 dm tall; ribs usually 13–16; Great Basin, Iron Co., or Colorado River drainage..... 30
30a (29b)	Plants of the Great Basin. 31
30b	Plants of the Colorado River drainage..... 33
31a (30a)	Spines not obscuring the stems, with up to 20 per areole; usually with 1 dark hooked central spine, all others white to tan, none ribbon-like; flowers mostly yellow or rarely pink; growing in calcareous soils or sometimes (if hybridized) on igneous soils; Beaver, Juab, Millard, and Tooele cos. (Great Basin little barrel cactus)..... <i>Sclerocactus pubispinus</i> <pg #>
31b	Spines more or less obscuring the stems, with up to 31 per areole; 1–3(6) dark hooked spines per areole, the others white, tan, reddish, brownish, or black; flowers pink 32

- 32a (31b) Spines somewhat obscuring the stems, with up to 20 per areole; 1–3 hooked spines per areole; upper central spine flattened, but no spines ribbon-like; most often in igneous soils and, less often, on calcareous soils; Beaver, Iron, Juab, Millard, and Sevier cos. (spiny little barrel cactus)*Sclerocactus spinosior* <pg #>
- 32b Spines more or less obscuring the stem, with up to 31 per areole, white or some tan, reddish, or black; hooked spines 1–3(6) per areole; upper central spine flattened, sometimes noticeably ribbon-like (sometimes with several ribbon-like spines per areole), especially on older plants; igneous, calcareous, or sandy soils; Iron Co. (Blaine's little barrel cactus).....*Sclerocactus blainei* <pg #>
- 33a (30b) Upper central spine noticeably flattened and sword-like, directed toward the stem apex; flowers yellow; very limited distribution on sandstone soil in southern San Juan Co. (Whipple's little barrel cactus).....*Sclerocactus whipplei* <pg #>
- 33b Upper central spine not noticeably flattened and sword-like, not strongly directed toward the stem apex; flowers pink, yellow, pale shades, or white; distribution not as above34
- 34a (33b) Plants small, usually not more than 8–9 cm tall; stems globose, becoming cylindric late in their life cycle; spines not obscuring the stem; flower buds dark red brown, with a rounded apex; flowers pale pink to white or cream; filaments dark pink; sympatric with *Sclerocactus parviflorus* only at the edges of the distribution range; endemic to Emery and Wayne cos. (Wright's little barrel cactus)*Sclerocactus wrightiae* <pg #>
- 34b Plants up to 23 cm or more tall; stems becoming cylindric relatively early in their life cycle; spines often somewhat obscuring the stem; flower buds greenish-brown, with a pointed apex; flowers most often pink, less often yellow (in two limited areas, west of Capitol Reef and east of Hite), rarely white; filaments greenish or yellowish; widespread in most of the Colorado River drainage; Carbon, Duchesne, Emery, Garfield, Grand, Kane, San Juan, Sevier, Uintah, and Wayne cos. (common little barrel cactus)....*Sclerocactus parviflorus* <pg #>

Key V: Vines

- 1a Leaves mostly alternate2
- 1b Leaves opposite (if the tendrils are opposite the leaf, take the other route)6
- 2a (2a) Leaves simple.....3
- 2b Leaves compound5
- 3a (2a) Leaves palmate (canyon grape).....*Vitis arizonica* <pg #>
- 3b Leaves pinnate4

- 4a (3b) Leaves lanceolate ovate to lanceolate elliptic or oblong, tapering to a narrow base; spines usually present, sometimes very sparse (matri-mony vine)..... *Lycium barbarum** <pg #>
- 4b Leaves ovate, usually hastate at the base; lacking spines (European bittersweet)*Solanum dulcamara** <pg #>
- 5a (2b) Vines climbing; widest leaflets sometimes more than 6 cm wide; es-caped from cultivation (Virginia creeper).....
.....*Parthenocissus quinquefolia** <pg #>
- 5b Vines trailing, weakly climbing; widest leaflets usually less than 6 cm wide; native in canyons and hanging gardens in Garfield, Kane, and San Juan cos. (thicket creeper)..... *Parthenocissus vitacea* <pg #>
- 6a (1b) Leaves simple.....7
- 6b Leaves pinnately to ternately compound8
- 7a (6a) Leaves pinnately veined, elliptic to obovate, sometimes orbicular, long hairy to glabrous, a few teeth toward the tip or occasionally entire, 0.7–2.5 cm long, the base cuneate; in coniferous and aspen forests; 1830–2930 m; Uinta Mountains and Wasatch Plateau (twin-flower)*Linnaea borealis* <pg #>
- 7b Leaves palmately veined, with broad, rounded sinuses, ovate to or-bicular, rough hairy above, glandular dotted below, 3–15 cm long, the base deeply cordate; widespread; 1300–2430 m (American hop)*Humulus lupulus* <pg #>
- 8a (6b) Leaves pinnately compound, with 3–7 leaflets; leaflets 2–8 cm long, coarsely few toothed and/or lobed or entire; flowers white to cream, few to many in a cymose cluster (white virgin's-bower)*Clematis ligusticifolia* <pg #>
- 8b Leaves 1-, 2-, or 3-times compound or ternate pinnate; flowers blue, violet, or yellow, solitary9
- 9a (8b) Leaves 2(3) times ternately compound; leaflets sessile or short stalked, 4–50 mm long; flowers blue, solitary (Rocky Mountain clem-atiss) *Clematis columbiana* <pg #>
- 9b Leaves once ternate or ternate pinnate; leaflets distinctly stalked; flowers violet or yellow10
- 10a (9b) Leaflets 2–11 cm long; flowers violet blue to pinkish violet; moist woods and riparian habitats (purple virgin's-bower)
..... *Clematis occidentalis* <pg #>
- 10b Leaflets mostly 1–5 cm long; flowers yellow; disturbed weedy habi-tats in riparian communities (Oriental clematis)
.....*Clematis orientalis** <pg #>

Key VI: Shrubs

- 1a Leaves and/or branching habit usually opposite or whorled (sometimes alternate above, opposite below)..... **Group A <pg #>**
- 1b Leaves and/or branching habit usually alternate, basal, or in loose rosettes..... **2**
- 2a Leaves compound **Group B <pg #>**
- 2b Leaves simple and/or basal (sometimes palmatifid, fascicled, or pinatifid, but not compound)..... **3**
- 3a Stems and/or leaves spinescent to some degree (does not include spiny flowers or fruits) **Group C <pg #>**
- 3b Stems and leaves lacking spines **Group D <pg #>**

Key VI, Group A

(Shrubs with leaves opposite, or whorled at least distally; some may be alternate above and opposite below)

- 1a Leaves mostly whorled, or appearing so **2**
- 1b Leaves mostly opposite (occasionally alternate above, but opposite below)..... **11**
- 2a (1a) Leaves in whorls of 3, 6, or variable; stems mostly terete..... **3**
- 2b Leaves in whorls of 4 (occasionally 5); stems 4 angled **9**
- 3a (2a) Leaves densely white hairy, with stellate hairs, the margins undulate, crisped, or crenate; xeric sites, mainly on limestone outcrops; Washington Co. (Utah butterfly bush) ***Buddleja utahensis* <pg #>**
- 3b Not as above in most ways **4**
- 4a (3b) Leaves 15–45 mm long, lanceolate to ovate or elliptic, the margins serrate to serrulate, leaves actually alternate but appearing whorled due to non-elongation of the stem..... **5**
- 4b Leaves less than 15 mm long, awl shaped, sometimes spinulose tipped **6**
- 5a (4a) Leaves lanceolate ovate, widest toward the base; flowers white; below 2100 m; Iron and Washington cos. (Menzies' chimaphila) ***Chimaphila menziesii* <pg #>**
- 5b Leaves oblanceolate, widest toward the tips; flowers pink; above 2100 m; widespread (pipsissewa)..... ***Chimaphila umbellata* <pg #>**
- 6a (4b) Leaves in whorls of 3; evergreen; understory plants (common juniper) ***Juniperus communis* <pg #>**
- 6b Leaves in whorls of 6 or more (the leaves not truly whorled, but rather are opposite leaves that are deeply palmately divided) **7**

SHRUBS

- 7a (6b) Leaves rather soft, not prickly; flowers remain open day and night (flaxflower) ***Leptosiphon nuttallii* <pg #>**
- 7b Leaves firm, prickly; flowers mostly opening at night, usually closed during the day **8**
- 8a (7b) Plants sprawling or loosely matted (not cushioned or mat-like), up to 1 dm tall; leaves usually all opposite; flowers nocturnal (Watson's prickly phlox) ***Linanthus watsonii* <pg #>**
- 8b Plants usually erect, 1–6(8) dm tall; at least the upper leaves alternate or offset (granite prickly phlox) ***Linanthus pungens* <pg #>**
- 9a (2b) Plants shrubby, erect, up to 10 dm tall; leaves rigid, awl-like, sometimes revolute; stems with an exfoliating white epidermis; Washington Co. (stellate bedstraw) ***Galium stellatum* <pg #>**
- 9b Plants herbaceous to suffrutescent, spreading, up to 4 dm tall; leaves not awl-like **10**
- 10a (9b) Leaf tips shortly awned; leaves mostly linear oblong to narrowly lanceolate or narrowly elliptic; corolla purple or brownish purple; fruit densely bristly, with hooked hairs; moist sites, riparian areas, and hanging gardens; 1310–1985 m; Washington Co. (Wright's bedstraw) ***Galium wrightii* <pg #>**
- 10b Leaf tips acute to cuspidate; leaves linear to broadly ovate; corolla greenish yellow; fruit with long flattened, straight, or flexible hairs; usually mesic to dry habitats; widespread (shrubby bedstraw) ***Galium multiflorum* <pg #>**
- 11a (1b) Leaves more or less scurfy or mealy, at least when young **12**
- 11b Leaves not scurfy or mealy, sometimes hairy **18**
- 12a (11a) Leaves aromatic; stems square (Dorr's sage) ***Salvia dorrui* <pg #>**
- 12b Leaves not aromatic; stems more or less round **13**
- 13a (12b) Leaves dark green above, pale or brownish below; branchlets with brown peltate scales; aspen and coniferous forests; 2040–3205 m (soapberry) ***Shepherdia canadensis* <pg #>**
- 13b Leaves usually light green to whitish or silvery gray; branchlets lack brown peltate scales **14**
- 14a (13b) Mature plants usually more than 6 dm tall **15**
- 14b Mature plants usually less than 6 dm tall; leaves sometimes alternate above, opposite to subopposite below **16**
- 15a (14a) Leaves evergreen, orbicular, ovate, or oval; thorns lacking; fruit covered with silvery stellate hairs; dry canyons in pinyon-juniper communities in southern Utah (roundleaf buffalo-berry) ***Shepherdia rotundifolia* <pg #>**

- 15b Leaves deciduous, oblong, oblanceolate, lanceolate, or elliptic; usually somewhat thorny; fruit red; usually in moist areas, such as streambanks and terraces (silver buffaloberry) *Shepherdia argentea* <pg #>
- 16a (14b) Plants low, spreading, usually less than 1.5 dm tall; leaves sessile, 3–18 mm long and 1–6 mm wide, sometimes opposite below and alternate above, linear to linear oblanceolate or oblong; saline soils, clays, and silts of eastern Utah; 1220–2150 m (mat saltbush).....*Atriplex corrugata* <pg #>
- 16b Plants prostrate to ascending or erect, mature plants 1–6 dm tall; leaves petiolate17
- 17a (16b) Plants decumbent to ascending, up to 4.5 dm tall; leaves sometimes opposite below and alternate above; bracteoles wingless, or with shallow wings, or a row of tubercules; typically on fine-textured saline soils; eastern Utah (Gardner's saltbush and Castle Valley saltbush).....*Atriplex gardneri* vars. *gardneri* and *cuneata* <pg #>
- 17b Plants usually erect, 1–6 dm tall; leaves usually opposite above and below; bracteoles with well-developed lateral wings; usually on talus slopes in the canyons of the Colorado River (Garrett's saltbush).....*Atriplex garrettii* <pg #>
- 18a (11b) Herbage and involucre bracts with scattered, conspicuous, embedded oil glands; leaves slender, trifid, pinnatisect, or entire, usually opposite, sometimes alternate; aromatic; xeric; below 1450 m in Garfield, Kane, San Juan, and Washington cos.19
- 18b Not as above in most ways20
- 19a (18a) Leaves pinnatisect, divided into 3–7 (usually 5) slender lobes; heads borne on elongate peduncles, elevated well above the plant (scale glandweed) *Thymophylla pentachaeta* <pg #>
- 19b Leaves entire, rarely irregularly lobed; heads sessile, not elevated above the leafy part of the plant (dogweed) ... *Thymophylla acerosa* <pg #>
- 20a (18b) Leaves compound21
- 20b Leaves simple.....24
- 21a (20a) Leaves with 5 or more leaflets, 3–35 cm long.....22
- 21b Leaves with 2–3 leaflets, less than 8 cm long.....23
- 22a (21a) Mature plants 2–6 m tall; leaflets 5–9(11), glabrous; fruit black, with a waxy bloom; usually below 2600 m (blue elderberry) *Sambucus caerulea* <pg #>
- 22b Mature plants to 2 m tall; leaflets 5–7; fruit red to purple, lacking a waxy bloom; usually above 2500 m (red elderberry)*Sambucus racemosa* <pg #>
- 23a (21b) Leaves with 2 sessile resinous leaflets; shrubs 1–3 m tall; stems with dark bands (creosote bush).....*Larrea tridentata* <pg #>

23b	Leaves with 3 leaflets, not resinous; large shrubs or trees 2–8 m tall; stems without dark bands (Rocky Mountain maple) .. <i>Acer glabrum</i> <pg #>
24a (20b)	Mature plants usually less than 3(5) dm tall at maturity; stems erect, mat forming, suffrutescent, caespitose, in small clumps, or in mounds (try both routes if evidence of environmental factors, including grazing, have affected height) 25
24b	Mature plants usually more than 3 dm tall; stems usually erect 40
25a (24a)	Leaves appearing whorled, but actually opposite and deeply pinnatifid, each with 3–9 clefts 26
25b	Not as above 28
26a (25a)	Leaves rather soft, the tips awl shaped to minutely spinulose (flax-flower) <i>Leptosiphon nuttallii</i> <pg #>
26b	Leaves firm, prickly 27
27a (26b)	Plants sprawling to loosely matted; stems not obscured by the leaves (Watson's prickly phlox) <i>Linanthus watsonii</i> <pg #>
27b	Plants pulvinate caespitose, with rope-like stems; stems obscured by the overlapping leaves (mat prickly phlox)..... <i>Linanthus caespitosus</i> <pg #>
28a (25b)	Plants more or less spinescent 29
28b	Plants not particularly spinescent 32
29a (28a)	Herbage more or less glandular hairy, sometimes glabrous; flowering stems more than twice the length of the vegetative stems (shrubby sandwort) <i>Eremogone macradenia</i> <pg #>
29b	Herbage sometimes hairy, but usually not glandular; flowers and stems equal to or shorter than the vegetative stems..... 30
30a (29b)	Leaves green, glabrous or nearly so, usually 15–35 mm long and up to 3 mm wide; cliffs and ledges in Zion Canyon and its tributaries; endemic to Kane and Washington cos.; 1435–2600 m (Zion phlox) <i>Phlox jonesii</i> <pg #>
30b	Leaves pilose puberulent, hirtellous, granular scaberulose, to subglabrous, 5–22 mm long 31
31a (30b)	Plants more or less compact, the internodes not readily apparent; leaves 5–15 mm long (desert phlox) <i>Phlox austromontana</i> var. <i>austromontana</i> <pg #>
31b	Plants more or less open, the internodes usually apparent; leaves 10–22 mm long (Silver Reef phlox) <i>Phlox austromontana</i> var. <i>prostrata</i> <pg #>
32a (28b)	Leaves with revolute margins 33
32b	Leaf margins not revolute 35

- 33a (32a) Upper leaves alternate, lower leaves usually opposite, glabrous to scaberulose; fruit a membranous circumscissile capsule; flowers bright yellow; 1500–2000 m (rough menodora) *Menodora scabra* <pg #>
- 33b Upper leaves opposite.....34
- 34a (33b) Leaves densely hairy, with stellate hairs, linear to narrowly oblong, the margins undulate, crisped, or crenate; xeric sites; 800–1100 m; mainly on limestone outcrops in Washington Co. (Utah butterfly bush)..... *Buddleja utahensis* <pg #>
- 34b Leaves dark green, glabrous above, with fine pale hairs below, lanceolate oblong to elliptic; moist and mesic sites; 2900–3750 m (bog laurel) *Kalmia microphylla* <pg #>
- 35a (32b) Leaves gland pitted, aromatic; stems strigose, the young twigs somewhat square in cross section; flowers in a head, subtended by orbicular to ovate ciliate bracts; corolla rose purple to whitish (mountain monardella)..... *Monardella odoratissima* <pg #>
- 35b Leaves not gland pitted, not particularly aromatic; stems usually terete; flowers not subtended by bracts; corollas white, blue, lavender, or red36
- 36a (35b) Leaves entire, linear to narrowly oblanceolate, to 3.5 cm long; plants often mat forming; flowers lavender blue; Beaver, Garfield, Iron, Kane, and Washington cos. (flaxleaf penstemon) *Penstemon linarioides* <pg #>
- 36b Leaves serrulate, serrate, dentate, or crenate, at least in part; other characters may vary.....37
- 37a (36b) Leaves mostly petiolate38
- 37b Leaves mostly sessile.....39
- 38a (37a) Leaves somewhat folded, suborbicular to broadly ovate, thick, with dentate margins, glaucous, puberulent, and papillate, 2–3(3.5) cm long and 8–17 mm wide; stems becoming trunk-like, gnarled, and blackish near the base; petals carmine pink; rocky limestone outcrops in Beaver Dam Mountains, Washington Co; rare; below 1400 m (crevice penstemon) *Penstemon petiolatus* <pg #>
- 38b Leaves leathery, dark green, often glossy above, the margins spinulose serrate to crenate serrate or serrulate; young stems sometimes somewhat square, with more or less corky ridges; flowers reddish brown, inconspicuous; widespread; usually above 1600 m (mountain lover)..... *Paxistima myrsinites* <pg #>
- 39a (37b) Stems slender, decumbent to ascending or erect; upper leaves elliptic or lanceolate, and sessile, lower leaves spatulate or oblanceolate, and short petiolate; leaves 1–3(4) cm long and 2–8(18) mm wide; stems glabrous to puberulent; flowers white, with a lavender tinge inside the throat, the upper lip brownish; 2000–2700 m; Box Elder Co. (hotrock penstemon) *Penstemon deustus* <pg #>

39b	Plants often forming loose mats, sprawling or decumbent; leaves spatulate, elliptic, ovate, or broadly lanceolate, all cauline, 1.5–3.5(5) cm long and 7–17(25) mm wide; flowers blue to lavender; 1500–3200 m; cracks and crevices of rocks and on talus; Duchesne, Juab, Salt Lake, San Pete, and Utah cos. (cordroot penstemon) <i>Penstemon montanus</i> <pg #>
40a (24b)	Plants more or less spinescent (some bluntly so, as in the tips of older stems)..... 41
40b	Plants not spiny 46
41a (40a)	Mature plants usually less than 1 m tall 42
41b	Mature plants usually more than 1 m tall 45
42a (41a)	Leaves linear or needle-like, with 4–9 pair of leaves per stem; plants suffrutescent, 2–6 dm tall; flowering stems more than 2 times the length of the vegetative stems (shrubby sandwort) <i>Eremogone macradenia</i> <pg #>
42b	Leaves not linear or needle-like; plants not suffrutescent; flowering stems less than twice the length of the vegetative stems..... 43
43a (42b)	Plants to 5 dm tall; leaves spinulose serrate to entire, with an acuminate spinulose tip, 6–36 mm long, the veins thick, prominent; heads solitary; rock crevices and on talus slopes; Garfield, Kane, San Juan, and Washington cos. (spiny brickellbush)..... <i>Brickellia atractyloides</i> <pg #>
43b	Plants 5–15 dm tall; leaves entire, 3–15 mm long, the veins not particularly prominent..... 44
44a (43b)	Leaves not fascicled, oblong to broadly ovate, up to 2 cm long and 1 cm wide; plants 3–10 dm tall; mature fruit inflated, bladder-like (bladder sage)..... <i>Salazaria mexicana</i> <pg #>
44b	Leaves fascicled on the spur branches, oblanceolate, 3–12 mm long and 0.8–1.5 mm wide; herbage dark gray green; bark gray, exfoliating; fruit a capsule (blackbrush)..... <i>Coleogyne ramosissima</i> <pg #>
45a (41b)	Leaves and stems with silvery peltate scales, the margins entire; fruit red; widespread (silver buffaloberry) <i>Shepherdia argentea</i> <pg #>
45b	Leaves and stems lacking silvery peltate scales; leaf margins entire to serrulate; fruit blue black; along sandy terraces of the San Juan and Colorado rivers and their tributaries (desert olive)..... <i>Forestiera pubescens</i> <pg #>
46a (40b)	Plants evergreen; leaves more or less leathery 47
46b	Plants mostly deciduous, some leaves more or less persistent; leaves not particularly leathery (if difficult to determine, try both ways) ... 51
47a (46a)	Mature plants usually less than 8 dm tall 48
47b	Mature plants usually more than 8 dm tall 49

- 48a (47a) Branchlets tomentose, terete, intricately branched; leaf margins entire; endemic to Grand and San Juan cos. (Franklin's ceanothus)..... ***Ceanothus greggii* var. *franklinii* <pg #>**
- 48b Branchlets not tomentose, sometimes squarish and somewhat corky; leaf margins toothed; found in all Utah counties (mountain lover)..... ***Paxistima myrsinites* <pg #>**
- 49a (47b) Branchlets covered with stellate hairs; leaves oval, orbicular, or ovate, the upper surface silvery green, the lower surface white or yellowish (roundleaf buffaloberry)..... ***Shepherdia rotundifolia* <pg #>**
- 49b Plants lack stellate hairs; leaves elliptical to ovate or obovate; equally gray hairy above and below **50**
- 50a (49b) Leaves less than 3 cm long and 3–8 mm wide (Mojave ceanothus) ...
..... ***Ceanothus greggii* var. *vestitus* <pg #>**
- 50b Leaves more than 3 cm long and 20–35 mm wide (silk-tassel bush)..... ***Garrya flavescens* <pg #>**
- 51a (46b) Leaves palmate..... **52**
- 51b Leaves pinnate **53**
- 52a (51a) Shrubs or small trees, usually more than 15 dm tall; herbage glabrous; leaves simple or trifoliate, usually more than 2 cm wide; above 1600 m (Rocky Mountain maple) ***Acer glabrum* <pg #>**
- 52b Shrubs less than 15 dm tall; herbage hairy; leaves simple, less than 2 cm wide; rocky limestone slopes and ledges; below 1250 m; Washington Co. (aloesia) ***Aloysia wrightii* <pg #>**
- 53a (51b) New stems almost leafless, slender, green; plants 6–10 dm tall; leaves linear, usually less than 5 cm long, sometimes alternate; gravel washes, terraces, talus slopes, and rock outcrops, on limestone; 850–1100 m; Beaver Dam Mountains, Washington Co. (sweet-bush)..... ***Bebbia juncea* <pg #>**
- 53b New stems more or less leafy; other characters may vary **54**
- 54a (53b) Leaves ovate to round, less than 15 mm long, scabrous strigose above, densely hairy below, the hairs resinous, glandular, grayish or yellowish; stems slender, gray, brittle; bark peeling easily in thin strips; wood bright yellow; herbage aromatic; uncommon; limestone rocky slopes in Washington Co. (aloesia)..... ***Aloysia wrightii* <pg #>**
- 54b Not as above in all characters **55**
- 55a (54b) Leaves sessile, or nearly so **56**
- 55b Leaves with petioles **64**
- 56a (55a) Plants suffrutescent (if difficult to determine, try both ways)..... **57**
- 56b Plants not suffrutescent..... **62**

- 57a (56a) Leaves more or less filiform, involute, appearing terete, 4–40(50) mm long; stems slender, branching candelabra-like; flowers pink; dunes and sandy soil (bush penstemon)..... ***Penstemon ambiguus* <pg #>**
- 57b Leaves not filiform; other characters may vary**58**
- 58a (57b) Plants aromatic; stems 4 angled (mountain monardella)
..... ***Monardella odoratissima* <pg #>**
- 58b Plants not particularly aromatic; stems mostly round.....**59**
- 59a (58b) Leaves entire**60**
- 59b Leaves with serrate or dentate margins**61**
- 60a (59a) Plants usually more than 4 dm tall; herbage glabrous, glaucous; leaves 1.5–9 cm long; flowers purple blue, staminode, with white hairs; endemic to Juab, Utah, and Wasatch cos. (littlecup penstemon) ***Penstemon sepalulus* <pg #>**
- 60b Plants usually less than 4 dm tall; stems puberulent, the hairs terete, tapered, retrorsely spreading; leaves 0.8–3.5 cm long; flowers purple blue, staminode, with yellow hairs; Beaver, Garfield, Iron, Kane, and Washington cos. (flaxleaf penstemon)
..... ***Penstemon linarioides* <pg #>**
- 61a (59b) Stems slender, decumbent to ascending or erect; upper leaves elliptic or lanceolate, sessile; lower leaves spatulate or oblanceolate, short petiolate; leaves 1–3(4) cm long and 2–8(18) mm wide; stems glabrous to puberulent; flowers white, with a lavender tinge inside the throat, the upper lip brownish; 2000–2700 m; Box Elder Co. (hotrock penstemon) ***Penstemon deustus* <pg #>**
- 61b Plants often forming loose mats, sprawling or decumbent; leaves spatulate, elliptic, ovate, or broadly lanceolate, all cauline, 1.5–3.5(5) cm long and 7–17(25) mm wide; flowers blue to lavender; 1500–3200 m; cracks and crevices of rocks and on talus; Duchesne, Juab, Salt Lake, San Pete, and Utah cos. (cordroot penstemon) ***Penstemon montanus* <pg #>**
- 62a (56b) Leaves densely white tomentose, 1–3 cm long, not revolute; stems canescent; sandy sites and stabilized dunes (purple sage) ***Poliomintha incana* <pg #>**
- 62b Leaves sometimes hairy, but not densely tomentose, sometimes slightly revolute; habitat various**63**
- 63a (62b) Plants 1–2 m tall; bark longitudinally ridged, grooved; leaves appearing fasciculate, sparingly strigose on both sides, 9–30 mm long and 2–7 mm wide (fendlerbush)..... ***Fendlera rupicola* <pg #>**
- 63b Plants up to 1 m tall; bark on the twigs strigose, whitish, exfoliating in strips or flakes; leaves 4–12 mm long and 1–6 mm wide, strigose to slightly pustulose (Utah fendlerella)..... ***Fendlerella utahensis* <pg #>**
- 64a (55b) Longest leaves usually more than 8 cm long.....**65**

- 64b Longest leaves usually less than 8 cm long66
- 65a (64a) Twigs usually red to purple, sometimes yellow or green; lenticels conspicuous; leaves without ciliate margins, the upper pair not fused; pith round; buds long, tapered, with 1 pair of scales, reddish gray, hairy; pith of the petiole stringy, elastic (red-osier dogwood) ***Cornus sericea* <pg #>**
- 65b Twigs usually whitish or tan; lenticels usually inconspicuous; leaves with ciliate margins, the upper pair often fused; pith 6 angled; buds with several scales; flower light brown, typically paired with the fruit; fruit black, with enlarged red-purple bracts; pith of the petiole not stringy or elastic (black twinberry) ***Lonicera involucrata* <pg #>**
- 66a (64b) Leaves regularly serrate, white hairy below; buds with 1 pair of white hairy scales67
- 66b Leaves entire or irregularly toothed, lobed, or serrulate; buds various.....68
- 67a (66a) Leaves with more than 13 teeth; Juab and Salt Lake cos. (cliff jamesia) ***Jamesia americana* <pg #>**
- 67b Leaves with 13 or fewer teeth; western Millard Co. (basin jamesia) ***Jamesia tetrapetala* <pg #>**
- 68a (66b) Mature bark not particularly shreddy.....69
- 68b Mature bark usually shreddy71
- 69a (68a) Shrubs or small trees up to 4(6) m tall; branchlets 4 angled; leaves ovate to orbicular, rarely trifoliate; xeric sites (single leaf ash) ***Fraxinus anomala* <pg #>**
- 69b Shrubs up to 2 m tall; branchlets not 4 angled; leaves elliptic to ovate, simple.....70
- 70a (69b) Lenticels conspicuous; leaf base cuneate; along the Colorado and San Juan river drainages (desert olive)... ***Forestiera pubescens* <pg #>**
- 70b Lenticels inconspicuous; leaf base rounded to cordate; mountain brush, ponderosa, aspen, and spruce-fir communities (Utah honeysuckle) ***Lonicera utahensis* <pg #>**
- 71a (68b) Leaves 3-nerved from the base, strigose, glabrous, lighter below (littleleaf mockorange)..... ***Philadelphus microphyllus* <pg #>**
- 71b Leaves with 1 main nerve from the base; other characters may vary ..
.....72
- 72a (71b) Leaves usually less than 1.5 cm long; stems intricately branched, spreading at nearly right angles to the stem axis; usually in semiarid environments (long-flowered snowberry) ***Symphoricarpos longiflorus* <pg #>**
- 72b Leaves usually more than 1.5 cm long; more likely in mesic environments73

- 73a (72b) Leaves usually 2–8(10) cm long; spreading from rhizomes; corolla short campanulate; usually riparian, with cottonwood and willow; Daggett, Duchesne, and Uinta cos. (western snowberry) *Symphoricarpos occidentalis* <pg #>
- 73b Leaves 1–5 cm long; corolla campanulate to tubular funnellform; foot-hills to subalpine, open slopes, in mountain brush, streamside, aspen clearings, and spruce-fir communities; widespread (mountain snow-berry) *Symphoricarpos oreophilus* <pg #>

Key VI, Group B

(Shrubs with alternate, compound leaves)

- 1a Leaves palmate, trifoliolate or mostly so2
- 1b Leaves pinnately compound, with 5–40 leaflets5
- 2a (1a) Terminal leaflets with well-defined stalks longer than the stalks of the lateral leaflets, the upper 1/2 of the leaflet coarsely and irregularly toothed, lobed, or wavy, the apex acuminate or acute; stems simple or sparingly branched; may cause severe dermatitis (poison ivy)..... *Toxicodendron rydbergii* <pg #>
- 2b Terminal leaflets sessile, lacking a well-defined stalk; other characters may vary3
- 3a (2b) Plants suffrutescent, usually less than 8 dm tall; leaves widely spaced, with 3–5 leaflets; stipules reduced to brownish-orange glands or absent; axillary tufts of hair common; flowers yellow, sometimes suffused with red or orange (broom lotus) *Lotus rigida* <pg #>
- 3b Plants not suffrutescent.....4
- 4a (3b) Leaflets entire to crenulate, not lobed, not particularly aromatic; fruit a round samara, slightly notched at both ends; limestone canyons in Garfield, Kane, and Washington cos.; rare in Utah (hop-tree) *Ptelea trifoliata* subsp. *pallida* <pg #>
- 4b Leaflets lobed, aromatic; fruit a reddish orange drupe (squawbush)... *Rhus aromatica* var. *trilobata* <pg #>
- 5a (1b) Plants not armed6
- 5b Plants usually armed to some degree (if difficult to determine, try both ways).....10
- 6a (5a) Leaves fern-like, bi- or tripinnately compound, strongly aromatic (fern bush)..... *Chamaebatiaria millefolium* <pg #>
- 6b Leaves once pinnate; sometimes aromatic.....7
- 7a (6b) Leaves even-pinnate, up to 13 cm long; leaflets 8–40, up to 20 mm long, linear, and all involute; shrubs often partially buried in sand (narrow-leaf dunebroom) *Parryella filifolia* <pg #>
- 7b Leaves odd-pinnate; leaflets 3–21; other characters may vary8

- p>8a (7b) Mature plants usually less than 1 m tall; leaflets 7 or fewer, entire to somewhat revolute; bark shreddy (shrubby cinquefoil)
- Dasiphora fruticosa*
- <pg #>
- 8b Mature plants to 1–6 m tall; leaflets 7 or more, serrate9
- 9a (8b) Lenticels conspicuous; leaflets serrulate; leaf scars crescent shaped; buds large, resinous, with points turning to one side; fruits glossy orange-red pomes; usually in shade in aspen and spruce-fir communities or along creeks (Rocky Mountain ash).....*Sorbus scopulina* <pg #>
- 9b Lenticels not particularly conspicuous; leaflets serrate; leaf scars somewhat lobed, nearly encircling the bud; buds small, woolly; fruits covered with viscid reddish-brown hairs (smooth sumac)*Rhus glabra* <pg #>
- 10a (5b) Leaflets with prickles or spines11
- 10b Leaflets lacking prickles or spines, but they sometimes occur elsewhere on the plant14
- 11a (10a) Plants evergreen; leaves leathery, with spinulose-toothed margins, sometimes glaucous, but not woolly on the underside12
- 11b Plants deciduous; prickles on the petioles and the veins of the lower surface of the leaves; leaves gray or white woolly on the underside ...13
- 12a (11a) Plants erect, usually more than 10 dm tall at maturity; leaflets blue glaucous, with 5–7 spinose teeth (Frémont’s barberry)*Berberis fremontii* <pg #>
- 12b Plants erect or decumbent, usually less than 5 dm tall at maturity; leaflets dark green, sometimes reddish, with 12–14 spinulose teeth (creeping barberry).....*Berberis repens* <pg #>
- 13a (11b) Stems with bristles (stipitate glandular or gland tipped) and straight, mostly terete prickles; bark exfoliating; usually above 2100 m (wild raspberry)*Rubus idaeus* <pg #>
- 13b Stems with flattened, broad-based, mostly recurved prickles; usually below 2200 m (black raspberry)*Rubus leucodermis* <pg #>
- 14a (10b) Leaflets usually glandular dotted, not serrate; stipules awl shaped or vestigial; plants more or less spinescent15
- 14b Leaflets not glandular dotted, margins serrate to doubly serrate; stipules conspicuous, adnate to the petioles; prickles usually present on the stems20
- 15a (14a) Glands obscure or lacking.....16
- 15b Glands conspicuous.....17
- 16a (15a) Leaves up to 4 cm long; leaflets 5–15, linear to narrowly oblong, 0.5–1.5 mm wide, with some soft, straight hairs; pods conspicuously gland dotted; Kane Co. (Mojave dalea).....*Psoralethamnus arborescens* var. *pubescens* <pg #>

16b	Leaves up to 6.5 cm long; leaflets 3–9, narrowly obovate to linear elliptic, 0.8–6 mm wide, silvery strigulose, sometimes sparsely glandular; pods with numerous tiny orange glands crowded into irregular elongated longitudinal ridges; Garfield, Kane, San Juan, Washington, and Wayne cos. (Frémont’s indigo-bush) <i>Psorothamnus fremontii</i> <pg #>
17a (15b)	Plants of calcareous substrates in the Beaver Dam Mountains, Washington Co. (glandular indigo-bush)..... <i>Psorothamnus polydenius</i> <pg #>
17b	Plants of Emery, Garfield, Kane, San Juan, and Wayne cos.18
18a (17b)	Mature plants less than 3.5 dm tall; leaves less than 2.8 cm long, with 5–13 leaflets; Mancos shale; endemic to Emery Co. (Jones’ indigo-bush)..... <i>Psorothamnus nummularius</i> <pg #>
18b	Mature plants 2.5–8 dm tall; leaves up to 5 cm long, with 7–17 leaflets; Emery, Garfield, Kane, San Juan, and Wayne cos.19
19a (18b)	Leaves 1–4 times longer than wide; leaflets obovate, oblanceolate, or obcordate; sandy soils, rocky areas, and fine-textured saline soils in drainages of the Muddy, Fremont, and White rivers; Emery, Garfield, Kane, San Juan, and Wayne cos. (Thompson’s indigo-bush)..... <i>Psorothamnus thompsoniae</i> var. <i>thompsoniae</i> <pg #>
19b	Leaves 4–7 times longer than wide; leaflets linear or linear oblanceolate; known only in the region of Monument Valley and west to Navajo Mountain, San Juan Co. (Whiting’s indigo-bush)..... <i>Psorothamnus thompsoniae</i> var. <i>whitingii</i> <pg #>
20a (14b)	Leaflets singly to doubly toothed, the teeth typically gland tipped; calyx 1.5–4 cm long; flowers mostly solitary; petals 2.2–4 cm long; fruit 1–2.5 cm long at maturity (Nootka rose)..... <i>Rosa nutkana</i> <pg #>
20b	Leaflets usually singly serrate, the teeth rarely gland tipped; calyx 1–2.2 cm long; flowers in small cymes, seldom solitary; petals 1–2.5 cm long; fruit 0.6–1 cm long at maturity (Woods’ rose) <i>Rosa woodsii</i> <pg #>

Key VI, Group C

(Shrubs; leaves alternate, simple; stems and/or leaves spinescent to some degree)

1a	Stems spinescent (some bluntly so, as in the tips of older stems); leaves occasionally spinescent or the entire leaf modified as a spine2
1b	Stems lacking spines; leaves spinescent.....42
2a (1a)	Leaves orbicular and/or palmatifid3
2b	Leaves otherwise10

- 3a (2a) Plants suffrutescent; vegetative stems less than 1 dm tall; leaves palmatifid, 3–5 cleft, and villous (budsage) *Picrothamnus desertorum* <pg #>
- 3b Plants not suffrutescent; vegetative stems more than 1 dm tall; leaves orbicular or pinnatifid..... 4
- 4a (3b) Leaves scurfy, orbicular to ovate (shadscale) *Atriplex confertifolia* <pg #>
- 4b Leaves not scurfy; leaf shape various 5
- 5a (4b) Herbage densely pubescent, somewhat glandular; leaves deeply 5 lobed, cleft 3/4 to nearly to the base; plants usually less than 1 m tall; 3–5 spines per node, internodal spines usually present; berries red, stipitate glandular; midmontane to subalpine (mountain gooseberry) *Ribes montigenum* <pg #>
- 5b Herbage not or rarely glandular; other characters may vary..... 6
- 6a (5b) New growth usually whitish to green or tan, usually glabrous; internodal prickles usually lacking; spines 1, rarely 3 or lacking; leaves cleft to near the middle of the blade, occasionally beyond, with the terminal lobe narrowing toward the base (whitestem gooseberry) *Ribes inerme* <pg #>
- 6b New growth not particularly white; other characters may vary 7
- 7a (6b) Petioles up to 5 cm long; internodal bristles dense to sparse, or lacking; usually in moist habitats 8
- 7b Petioles less than 1.5 cm long; internodal bristles usually lacking; usually in dry habitats 9
- 8a (7a) Branchlets mostly reddish brown, with sparse to dense prickles; leaves glabrous, cleft to less than 1/2 the distance to the base (swamp gooseberry) *Ribes lacustre* <pg #>
- 8b Branchlets not reddish brown, sometimes with internodal prickles; leaves closely pubescent, cleft 1/2–2/3 to the base; along south slope of the Uinta Mountains, rather rare (inland gooseberry) *Ribes oxycanthoides* <pg #>
- 9a (7b) Leaves usually more than 1.5 cm long, 5 lobed; hypanthium 4–5.5 mm long; corolla white pink; sepals 4–6 mm long; berries smooth, mostly glabrous; southern third of the state (trumpet gooseberry) *Ribes leptanthum* <pg #>
- 9b Leaves usually less than 1.5 cm long, 3–5 lobed; hypanthium 1–2 mm long; corolla yellow; sepals 2–4 mm long; berries more or less pubescent, glandular; western and southwestern Utah (desert gooseberry) *Ribes velutinum* <pg #>
- 10a (2b) Mature leaves (at least some) usually fascicled 11
- 10b Leaves not particularly fascicled when mature 23

11a (10a)	Spines 3-parted at the nodes; branchlets reddish or purplish brown; leaves 8–60 mm long and 4–14 mm wide, entire to somewhat serrate, oblanceolate to spatulate; flowers yellow; berries red; 1585–2300 m; Grand and San Juan cos. (Fendler's barberry) <i>Berberis fendleri</i> <pg #>
11b	Spines not 3-parted; other characters may vary.....12
12a (11b)	Leaves fleshy, usually less than 3 mm wide13
12b	Leaves not particularly fleshy.....14
13a (12a)	Leaves usually linear, 3–45 mm long, sometimes bluntly spinescent; some older branches tend to persist among the new ones, becoming spine-like; flowers inconspicuous, with catkin-like staminate spikes; saline environments; widespread (greasewood)..... <i>Sarcobatus vermiculatus</i> <pg #>
13b	Leaves usually spatulate or oblanceolate, usually less than 15(20) mm long; spines slender, needle-like; flowers perfect, white to yellowish, with bluish-lavender lobes (Anderson's lycium)..... <i>Lycium andersonii</i> <pg #>
14a (12b)	Young stems usually densely white pannose or tomentose; hairs usually obscuring the stem15
14b	Young stems usually not white pannose or tomentose; stems sometimes whitish or with hairs, but the hairs not obscuring the stem ...18
15a (14a)	Branchlets white pannose or tomentose, with glabrescent streaks developing below the base of the primary leaves (spines); most or all of the primary leaves modified into white, rigid, spreading spines, 2–25 mm long; flower heads yellow; 1370–1850 m; northern and western Utah (Nuttall's horsebrush) <i>Tetradymia nuttallii</i> <pg #>
15b	Branchlets pannose or tomentose, without glabrescent streaks; other characters may vary.....16
16a (15b)	Spines recurved, 5–15 mm long; leaves linear filiform to spatulate, 3–25 mm long, glabrous or glabrescent; flowering heads yellow, in the axils of the spines; usually sandy or alkaline sinks; not of Washington Co. (spiny horsebrush)..... <i>Tetradymia spinosa</i> <pg #>
16b	Spines usually straight, sometimes slightly curved17
17a (16b)	Leaves glabrous or sparsely arachnoid, mostly 2–12(20) mm long, filiform to clavate; spines 10–50 mm long, some becoming slightly curved; flowering heads yellow, in the axils of the spines; 1600–1800 m; Washington Co. (longspine horsebrush)..... <i>Tetradymia axillaris</i> <pg #>
17b	Leaves usually very pubescent, becoming glabrescent, 3–25 mm long and 1–25 mm wide, narrowly oblanceolate spatulate to elliptic, sometimes fascicled; spines usually straight; flowers in few-flowered racemes, light yellowish green, with purple-tipped upper petals;

- alkaline clay hills; Box Elder. Emery, Juab, Millard, San Juan, Tooele, and Washington cos. (thorny milkwort) *Polygala acanthoclada* <pg #>
- 18a (14b) Twigs, leaves, and peduncles densely hirtellous; twigs green, soon becoming white; leaves usually not more than 2 times longer than wide, 3–12 mm long and 2–7 mm wide, obovate to elliptic, sometimes resinous; flowers in small, radiate, few-flowered heads at the ends of short naked branches; rocky or sandy soils or rocky outcrops; 700–950 m; Washington Co. (chaffbush) *Amphipappus fremontii* <pg #>
- 18b Twigs and leaves not densely hirtellous; leaves usually more than 2 times longer than wide; other characters may vary **19**
- 19a (18b) Leaves sessile, or nearly so, usually puberulent on both sides, cuneate, spatulate, entire, or few toothed near the apex; branchlets pubescent, bluntly spinescent, with some older branches tending to persist among the new ones, becoming spine-like; fruit a hairy drupe; rocky slopes and washes; 600–2100 m; Beaver, Millard, Iron, and Washington cos. (desert almond) *Prunus fasciculata* <pg #>
- 19b Leaves with petioles, glabrous or with hairs; fruit a berry **20**
- 20a (19b) Herbage strongly glandular puberulent, densely leafy; hairs of the calyx and the pedicles mostly 3–6 celled; fruit a dry greenish berry, constricted near the top; sandy washes and foothills; 760–1065 m; Washington Co. (Cooper's lycium) *Lycium cooperi* <pg #>
- 20b Herbage not glandular puberulent; leaves usually glabrous, or nearly so; berries red, salmon, or blue, fleshy, not constricted near the top **21**
- 21a (20b) Leaves glaucous; flowers greenish or off-white, with brownish-purple veins; fruit red to reddish blue; 1000–1870 m; Garfield, Iron, Kane, San Juan, and Washington cos. (pale wolfberry) *Lycium pallidum* <pg #>
- 21b Leaves not glaucous; flowers lavender purple or greenish; berries salmon to red **22**
- 22a (21b) Stems erect, very spiny; leaves mostly oblanceolate, spatulate to obovate; berries red; desert washes and valleys of southern Utah; 760–1160 m; Garfield, Grand, Washington, and Wayne cos. (Torrey's lycium) *Lycium torreyi* <pg #>
- 22b Stems often arching or clambering, somewhat spiny to almost spineless; leaves lanceolate, elliptic, oblong, or sometimes oblanceolate; berries salmon to red; disturbed sites, cemeteries, old home sites, and fencerows; widespread; 930–2130 m (matrimony vine) *Lycium barbarum** <pg #>
- 23a (10b) Leaves succulent, semicylindrical; saline substrates (greasewood) *Sarcobatus vermiculatus* <pg #>

23b	Leaves otherwise; substrates various.....	24
24a (23b)	Longest leaves more than 3 cm long.....	25
24b	Longest leaves 3 cm or less long.....	30
25a (24a)	Margins entire or minutely dentate; subshrubs with milky juice; leaves linear, entire, 1–3 mm wide, sessile; light brown tufts of wool in the axils of the bud scales at ground level (thorny skeleton-weed).....	<i>Pleiocanthus spinosus</i> <pg #>
25b	Margins serrate, doubly serrate, or somewhat lobed.....	26
26a (25b)	Thorns usually 1–3 cm long; leaves usually more than 1.5–4 times longer than wide, upper 1/2 not particularly lobed; mature pome dark purple to black (if confusing, try both routes).....	27
26b	Thorns usually more than 3 cm long; leaves usually 1.5–2 times longer than wide, upper 1/2–2/3 somewhat lobed; mature pome red, orange, or brown.....	28
27a (26a)	Mature leaf blades usually more than 2 times longer than wide; fruits 6–8 mm wide; plants of the Uinta Basin (Duchesne hawthorn).....	<i>Crataegus douglasii</i> var. <i>duchesnensis</i> <pg #>
27b	Mature leaf blades usually less than 2 times longer than wide; fruits 8–12 mm wide; widespread (river hawthorn)	<i>Crataegus douglasii</i> var. <i>rivularis</i> <pg #>
28a (26b)	Petioles, at least some, with stalked, red glands; leaf serrations are red tipped; Cache Co. (fireberry hawthorn).....	<i>Crataegus chrysocarpa</i> <pg #>
28b	Petioles lack stalked, red glands; glands, if present on leaf serrations, not conspicuous.....	29
29a (28b)	Leaves pubescent on both surfaces; pome dark red; dry gravel slopes in Provo Canyon, Utah Co. (red hawthorn).....	<i>Crataegus columbiana</i> <pg #>
29b	Leaves sparsely pubescent above and glabrous below; pome orange red to dark brown; stream banks and canyon slopes, LaSal Mountains, San Juan Co. (Rocky Mountain hawthorn)	<i>Crataegus erythropoda</i> <pg #>
30a (24b)	Herbage scurfy, at least when young	31
30b	Herbage not scurfy.....	33
31a (30a)	Leaves deltoid, ovate, rhombic, or oval; Washington Co. (Torrey's saltbush).....	<i>Atriplex torreyi</i> <pg #>
31b	Plants not as above.....	32
32a (31b)	Leaves spatulate, oblanceolate; fruiting bracts often reddish (spiny hopsage)	<i>Grayia spinosa</i> <pg #>

- 32b Leaves ovate to suborbicular; fruiting bracts gray, scurfy (shad-scale)***Atriplex confertifolia* <pg #>**
- 33a (30b) Leaves conspicuously 3-nerved from the base, elliptical to oblong ovate, pubescent below; plants 2–8 dm tall (Fendler's mountain lilac).....***Ceanothus fendleri* <pg #>**
- 33b Leaves mostly 1-nerved; other characters may vary**34**
- 34a (33b) Plants suffrutescent.....**35**
- 34b Plants not suffrutescent.....**36**
- 35a (34a) Plants 1–5 dm tall, with milky juice; leaves linear, 5–70 mm long and 1–3 mm wide; light brown tufts of wool in the axils of the bud scales at ground level (thorny skeletonweed)
.....***Pleiacanthus spinosus* <pg #>**
- 35b Plants 0.5–2 dm tall, without milky juice; leaves oblanceolate to spatulate or elliptic, 8–30 mm long and 2–10 mm wide; tufts of wool lacking (cushion milkwort)***Polygala subspinoso* <pg #>**
- 36a (34b) Young stems and/or leaves sometimes densely hairy (strigose, tomentose, or sericeous)**37**
- 36b Young stems and leaves usually not densely hairy (sometimes scabrous, scurfy, pubescent, or glabrous).....**39**
- 37a (36a) Leaves oblanceolate to linear to elliptic, 5–25 mm long and 1–5 mm wide; flowers whitish or yellowish green, with purple tips on the upper petals; most common on alkaline clay hills, usually above 1150 m (thorny milkwort).....***Polygala acanthoclada* <pg #>**
- 37b Leaves linear to lanceolate, lance-ovate, elliptic, or oblong, up to 2 mm wide; flowers reddish purple or maroon; 670–1170 m; western Washington Co.....**38**
- 38a (37b) Leaves linear, up to 1 mm wide; young twigs with appressed hairs; barbs on the spines of the fruit scattered along the upper 1/2; flowers only partially opened at maturity (range ratany).....
.....***Krameria erecta* <pg #>**
- 38b Leaves lanceolate, lance-ovate, elliptic, or oblong, up to 3 mm wide; young twigs with spreading hairs; barbs on the spines of the fruit located only at the apex; flowers open at maturity (white ratany).....***Krameria grayi* <pg #>**
- 39a (36b) Mature twigs whitish to gray or tan.....**40**
- 39b Mature twigs greenish**41**
- 40a (39a) Herbage scurfy pubescent, whitish tan, becoming gray with age; buds white scurfy; leaves sessile, sometimes somewhat fleshy; fruiting bracts often reddish; bark exfoliating in long thin strips when mature; plants 5–12 dm tall; 760–2900 m (spiny hopsage).....
.....***Grayia spinosa* <pg #>**

- 40b Herbage densely scabrous, buds not white scurfy; leaves short petioled; bark white; plants 3–8 dm tall; 700–950 m; Washington Co. (chaffbush) ***Amphipappus fremontii* <pg #>**
- 41a (39b) Base of the petiole with a conspicuous dark brown or black gland; leaves glaucous, not fleshy; stipules conspicuous; young stems somewhat striate; 1370–2320 m; Beaver, Juab, Kane, Millard, Tooele, and Washington cos. (greasebush) ***Glossopetalon spinescens* <pg #>**
- 41b Base of the petiole without a dark gland; leaves not glaucous, somewhat fleshy; stipules absent or inconspicuous; stems not striate; 670–825 m; Muddy Creek Formation; southwestern Washington Co. (spiny menodora) ***Menodora spinescens* <pg #>**
- 42a (1b) Leaves with lateral spines, the margins serrate **43**
- 42b Leaves without lateral spines, the margins mostly entire; leaf tips spinescent **47**
- 43a (42a) Small trees or large shrubs, 10–40 dm tall at maturity, evergreen; 2–6 pairs of spine-tipped lateral teeth; fruit an acorn (Dixie live-oak)..... ***Quercus turbinella* <pg #>**
- 43b Shrubs or subshrubs, usually less than 12 dm tall **44**
- 44a (43b) Leaves deeply 3–9-cleft, each segment spine tipped; lower leaves sometimes opposite (granite prickly phlox).....
..... ***Linanthus pungens* <pg #>**
- 44b Leaves not cleft **45**
- 45a (44b) Leaves ovate to lanceolate or deltoid, with conspicuous white veins, opposite or alternate, short petiolate; base truncate or rounded; outer involucre bracts wider and greener than the inner bracts, many veined, glandular puberulent; rock crevices and talus slopes; 820–1130 m; Garfield, Kane, San Juan, and Washington cos. (spiny brick-ellbush) ***Brickellia atractyloides* <pg #>**
- 45b Leaves not as above in most ways; outermost involucre bracts similar in width to the inner bracts, glandular, villous pilose..... **46**
- 46a (45b) Leaves inconspicuously few toothed, some entire, linear, lanceolate to narrowly oblanceolate, 2.5–5 cm long and 2.5–6 mm wide; involucre 10–13 mm long and 13–19 mm wide; ray flowers 13–17, white; Kaiparowits Formation; endemic to Garfield and Kane cos. (Cronquist's woodyaster)..... ***Xylorhiza cronquistii* <pg #>**
- 46b Leaves sharply spinulose toothed, lanceolate to elliptic, oblong, or oblanceolate, 1–10 cm long and 4–20 mm wide; involucre 12–20 mm long and 15–20(30) mm wide; ray flowers (15)18–60, usually lavender, seldom white; Garfield, Grand, Kane, San Juan, and Wayne cos. (Mojave woodyaster) ***Xylorhiza tortifolia* <pg #>**
- 47a (42b) Mature leaves usually fascicled (sometimes appearing whorled).... **48**
- 47b Mature leaves usually not fascicled **49**

- 48a (47a) Leaves 3–9-cleft, each segment spine tipped; lower leaves sometimes opposite (granite prickly phlox) *Linanthus pungens* <pg #>
- 48b Leaves linear, not cleft, weakly spine tipped; stems white pannose, except for brown streaks below the primary leaves (littleleaf horse-brush)..... *Tetradymia glabrata* <pg #>
- 49a (47b) Leaves tomentose on both sides50
- 49b Leaves not tomentose on both sides51
- 50a (49a) Leaves linear, up to 1 mm wide; young twigs with appressed hairs; barbs on the spines of the fruit scattered along the upper 1/2; flowers only partially opened at maturity (range ratany) .. *Krameria erecta* <pg #>
- 50b Leaves lanceolate, lance-ovate, elliptic, or oblong, up to 3 mm wide; young twigs with spreading hairs; barbs on the spines of the fruit located only at the apex; flowers open at maturity (white rat-any)..... *Krameria grayi* <pg #>
- 51a (49b) Leaves pinnatifid (roseate gilia).....*Ipomopsis roseata* <pg #>
- 51b Leaves not pinnatifid52
- 52a (51b) Leaves narrowly spatulate, leaves and branchlets smooth, resin coated; Sevier Co. (Greenwood's goldenbush).....
..... *Ericameria lignumviridis* <pg #>
- 52b Leaves narrowly lanceolate to oblong or elliptic, not resin coated.53
- 53a (52b) Leaves falcately curved, glutinous resinous; dunes and sandy soil (resinbush) *Chrysothamnus stylosus* <pg #>
- 53b Leaves not falcately curved, glabrous hirtellous; common on sand-stone (mountain goldenweed) .. *Chrysothamnus scopulorum* <pg #>

Key VI, Group D

(Shrubs; leaves simple, alternate, basal or in loose rosettes; stems and/or leaves lacking spines)

- 1a Stems fleshy, constricted at the nodes; leaves scale-like (pickle-weed)..... *Allenrolfea occidentalis* <pg #>
- 1b Plants not as above.....2
- 2a (1b) Stems and/or leaves more or less scurfy or mealy, at least when young; herbage often silvery or gray green3
- 2b Stems and leaves not scurfy, sometimes hairy; other characters may vary14
- 3a (2a) Buds globose, axillary, prominent (Brandeggee's siltbush)
..... *Zuckia brandegeei* <pg #>
- 3b Buds not as above in all characters.....4
- 4a (3b) Mature plants usually more than 1 m tall5

4b	Mature plants less than 1 m tall (if difficult to determine, try both ways).....	10
5a (4a)	Leaves usually deltoid, rhombic, or ovate triangular, sometimes sub-hastate, petiolate, up to 4 cm long; plants of Washington Co.....	6
5b	Leaves usually linear, lanceolate, oblanceolate, ovate, oblong spatulate, or elliptical, sometimes petiolate; may or may not be in Wash- ington Co.	7
6a (5a)	Stems angled, striate, bluntly spiny; leaves up to 16 mm wide; warm desert shrub communities (Torrey's saltbush) <i>Atriplex torreyi</i> <pg #>	
6b	Stems terete, not striate, not spiny; leaves up to 30 mm wide; stream or canal banks, drainage areas, and roadsides (big salt- bush).....	<i>Atriplex lentiformis</i> <pg #>
7a (5b)	Leaves petiolate, elliptical, lanceolate, oblanceolate; Garfield, Daggett, and Summit cos. (silverberry) <i>Elaeagnus commutata</i> <pg #>	
7b	Leaves sessile, or nearly so, spatulate, oblanceolate, or linear	8
8a (7b)	Longest leaves rarely to 2.5 cm long, spatulate obovate, ob- long; fine-textured saline soils; Washington Co. (desert salt- bush).....	<i>Atriplex polycarpa</i> <pg #>
8b	Longest leaves to 4 cm long, linear, oblanceolate, oblong, or obovate; nonsaline sandy soils.....	9
9a (8b)	Plants layering; fruiting bracteoles more than 12 mm long; moving sand; Juab Co. (giant fourwing saltbush)..... <i>Atriplex canescens</i> var. <i>gigantea</i> <pg #>	
9b	Plants not layering; fruiting bracteoles less than 12 mm long (four- wing saltbush).....	<i>Atriplex canescens</i> var. <i>canescens</i> <pg #>
10a (4b)	Mature plants less than 1.5 dm tall, forming dense white prostrate mats; leaves usually sessile, oblong, oblanceolate, spatulate, densely scurfy, 2–6(18) mm wide; leaf apex round or obtuse; proximal leaves opposite to subopposite; male flowers in dense spikes; fruiting bracts tuberculate, sometimes densely so; fine-textured saline soils of Man- cos shale (mat saltbush).....	<i>Atriplex corrugata</i> <pg #>
10b	Mature plants usually more than 1.5 dm tall; other characters may vary.....	11
11a (10b)	Leaves linear to oblong, usually 2–10 times longer than wide (Gard- ner's saltbush).....	<i>Atriplex gardneri</i> <pg #>
11b	Leaves obovate, orbicular, reniform, oval, or elliptical.....	12

- 12a (11b) Leaves prominently dentate (holly-like), silvery white to greenish, orbicular, reniform, or oval; leaves all alternate; below 750 m; southwestern Washington Co. (desert holly)
.....*Atriplex hymenelytra* <pg #>
- 12b Leaves usually entire or, rarely, crenate dentate, gray green; proximal leaves opposite or subopposite.....**13**
- 13a (12b) Stems decumbent to ascending; petioles to 12 mm; leaves 1–5 cm long; fruiting bracteoles usually densely tuberculate, especially on the lower sides; male flowers mostly brown, rarely yellow; 1220–2170 m; eastern Utah (Castle Valley saltbush)
.....*Atriplex gardneri* var. *cuneata* <pg #>
- 13b Stems stiffly erect; leaves oblong ovate to elliptical or orbicular, 1–3(3.5) cm long; fruiting bracteoles toothed across the broad apex, the sides usually smooth; male flowers yellow; 1525–1650 m; San Juan Co. (New Mexico saltbush)*Atriplex obovata* <pg #>
- 14a (2b) Stems appearing almost leafless; leaves sparse, inconspicuous**15**
- 14b Stems leafy; other characters may vary**17**
- 15a (14a) Stems tomentose (the tomentum sometimes densely matted); most leaves absent at flowering; flowers yellow (rabbitbrush)
.....*Ericameria nauseosa* <pg #>
- 15b Stems not tomentose; flowers pale yellow or purple black; Washington Co.....**16**
- 16a (15b) Stems broom-like, yellowish green, leafless most of the year; herbage conspicuously glandular, with a strong odor; leaves 0.5–1.5 cm long; flowers dark purple black; fruit 2 lobed; 760–1650 m (desert-rue).....
.....*Thamnosma montana* <pg #>
- 16b Stems slender, green, not broom-like; herbage not conspicuously glandular, not aromatic; leaves sparse, up to 7 cm long, linear, sometimes with linear lobes; flowers pale yellow, discoid; fruit an awned achene (sweetbush) *Bebbia juncea* <pg #>
- 17a (14b) Leaves with a sage-like odor when crushed.....**18**
- 17b Leaves sometimes aromatic when crushed, but without a sage-like odor**35**
- 18a (17a) Subshrubs, typically in cliff crevices and steep rocky slopes; mature leaves linear to broadly linear or linear oblanceolate, some toward the base are pinnately dissected or cleft, with linear segments; leaves glabrous, or with axe-shaped hairs; inflorescence corymbose, capitate, or short panicate.....**19**
- 18b Mostly shrubs, not typically growing in cliff crevices or steep rocky slopes; mature leaves other than above; inflorescence spicate, racemose, or panicate.....**20**

19a (18a)	Leaves and twigs of the season green, glabrate; usually found on limestone cliff crevices (sometimes quartzite); inflorescence corymbose; endemic to the Great Basin, not found in Washington Co. (false sagebrush) <i>Sphaeromeria diversifolia</i> <pg #>
19b	Leaves and twigs of the season silvery pubescent; usually occurring in crevices of sandstone cliffs; inflorescence a short panicle; Washington Co. (Ruth's sphaeromeria)..... <i>Sphaeromeria ruthiae</i> <pg #>
20a (18b)	Mature leaves all or mostly entire, sometimes irregularly lobed or with filiform or linear segments 21
20b	Mature leaves of vegetative stems lobed 22
21a (20a)	Mature leaves more than 2 mm wide, narrowly elliptic to lanceolate; stems not wand-like; mesic sites, desert mountains, high elevation valleys, usually on clay soils; 2270–3050 m; widespread (silver sagebrush)..... <i>Artemisia cana</i> <pg #>
21b	Mature leaves and/or leaf segments less than 2 mm wide, linear or filiform; stems wand-like; arid habitats, sandy soils; 825–2290 m; mostly southern Utah (sand sagebrush) <i>Artemisia filifolia</i> <pg #>
22a (20b)	Persistent leaves deeply cleft, usually more than 1/3 the leaf length; leaf segments filiform, linear, or orbicular (in <i>Artemisia spinescens</i>), less than 2 mm wide 23
22b	Persistent leaves shallowly cleft, usually less than 1/3 the leaf length; leaves usually wedge or bell shaped..... 27
23a (22a)	Leaves brittle, green, mostly glabrous, glandular, pinnately lobed; arid habitats, usually on gypsum soils or white shales; 1600–2440 m (pygmy sagebrush)..... <i>Artemisia pygmaea</i> <pg #>
23b	Leaves not brittle, gray, gray green, or silvery, tomentose 24
24a (23b)	Mature plants 2–20 dm tall; leaves up to 4 cm long; usually on deep, well-drained soils; 1500–1900 m; somewhat rare in Utah; Rich Co. (three-tipped sagebrush) <i>Artemisia tripartita</i> <pg #>
24b	Mature plants usually less than 5 dm tall; leaves less than 2 cm long 25
25a (24b)	Surface of leaves canescent, gray green; lobes acute, less than 1 mm wide; soils of igneous origin, often on glacial moraines; restricted to northern Utah; 2200–2800 m (hot springs sagebrush)..... <i>Artemisia arbuscula</i> subsp. <i>thermopola</i> <pg #>
25b	Surface of leaves and twigs densely villous tomentose..... 26
26a (25b)	Flowering stalks of the previous year spinescent; leaves mostly cauline; corolla and achenes with long cobwebby hairs; silty, clay, or sandy soils, often saline; 1200–1925 m (bud-sage) <i>Artemisia spinescens</i> <pg #>

- 26b Plants not spinescent; leaves cauline, basal; corolla and achenes glabrous; rocky well-drained soils in dry open grasslands, foothills, and mountains; 900–3500 m (fringed sagebrush) *Artemisia frigida* <pg #>
- 27a (22b) Mature plants usually 5–30 dm tall (if difficult to determine, try both ways).....**28**
- 27b Mature plants usually less than 5 dm tall.....**31**
- 28a (27a) Leaves variable in shape and size, with 3–6 irregular lobes or entire, the lobes rounded or acute; leaf veins join closer to the base of the lobes than to the midpoint of the leaf; inflorescence narrowly paniculate, extending well above the vegetative stems; moist soils; 2100–3400 m (subalpine sagebrush) ... *Artemisia spiciformis* <pg #>
- 28b Leaves usually uniform in shape, with 3 rounded shallow lobes; leaf veins closer to the midpoint of the leaf than to the base of the lobes.....**29**
- 29a (28b) Leaves usually less than 3 times longer than wide, with a camphor-like smell; inflorescence narrowly paniculate, extending well above the somewhat flat-topped foliage; plants 4–8 dm tall; 1800–3100 m (mountain sagebrush)..... *Artemisia tridentata* subsp. *vaseyana* <pg #>
- 29b Leaves usually more than 3 times longer than wide; inflorescence broadly paniculate, not conspicuously overtopping the rounded foliage; plants 10–25 dm tall**30**
- 30a (29b) Leaves about 4 times longer than wide; branchlets and flowering heads of the inflorescence usually erect; deep, well-drained soils, usually in valley bottoms and foothills where soil moisture is high; widespread in cold deserts; 1300–2200 m (basin sagebrush)..... *Artemisia tridentata* subsp. *tridentata* <pg #>
- 30b Leaves usually more than 5 times longer than wide; branchlets and flowering heads of the inflorescence drooping; loose sandy soils in warm deserts of southern Utah; below 1800 m (Mojave sagebrush)..... *Artemisia tridentata* subsp. *parishii* <pg #>
- 31a (27b) Tips of mature leaf lobes usually acute; flower heads with both ray and disk flowers, mostly nodding; growth habit low, branched; rimrock areas of the Colorado Plateau, often in canyons, ravines, or on cliff faces; below 2135 m (Bigelow's sagebrush)..... *Artemisia bigelovii* <pg #>
- 31b Tips of mature leaf lobes mostly rounded; flower heads discoid only, erect.....**32**
- 32a (31b) Leaves of the flowering stem mostly 3 lobed, early deciduous; flowering heads usually sessile, or nearly so, inner phyllaries densely pubescent; widespread; 1375–3200 m (low sagebrush) includes ssp. *arbuscula* and ssp. *longiloba* *Artemisia arbuscula* <pg #>

32b	Leaves of the flowering stem usually entire, persistent; flowering heads with a peduncle, inner phyllaries usually glabrous33
33a (32b)	Crown flat topped; leaves usually dark green to gray green, gland dotted, often sticky resinous when crushed (a whitish, eglandular form of the Uinta Basin is described as var. <i>duchesnensis</i> , S. L. Welsh and Goodrich); stalks brownish, persist into the following year; usually on rocky thin soils; 1400–2800 m (black sagebrush)..... <i>Artemisia nova</i> <pg #>
33b	Crown rounded or irregular; leaves grayish, not gland dotted34
34a (33b)	Leaves more than 3 times longer than wide; inflorescence broadly paniculate (dwarf form of basin sagebrush)..... <i>Artemisia tridentata</i> subsp. <i>tridentata</i> <pg #>
34b	Leaves less than 3 times longer than wide, somewhat bell shaped; inflorescence narrowly paniculate; well-drained soils in xeric habitats; 1500–2000 m (Wyoming sagebrush) <i>Artemisia tridentata</i> subsp. <i>wyomingensis</i> <pg #>
35a (17b)	Leaves usually lobed or cleft to some degree.....36
35b	Leaves mostly entire, serrate, or crenate (sometimes coarsely toothed, but usually not lobed or cleft).....76
36a (35a)	Mature leaves deeply cleft or dissected, some into long linear segments; cleft usually deeper than 3/4 of the distance from the tip to the midrib37
36b	Leaves lobed, but seldom cleft more than 3/4 of the distance from the lobe tip to the midrib49
37a (36a)	Large shrubs or trees, very woody; leaves up to 17 cm long, the lobes rounded, obtuse, or bilobed; fruit an acorn (Gambel oak) <i>Quercus gambelii</i> <pg #>
37b	Plants not as above in all ways38
38a (37b)	Leaves with hairs, sometimes with scales on 1 or both sides.....39
38b	Leaves glabrous to only sparsely hairy, sometimes glaucous.....44
39a (38a)	Subshrubs (very little woody tissue above the base).....40
39b	Shrubs with erect woody stems42
40a (39a)	Leaves 1–4 cm long, spinulose tipped, compact; cymose heads located at the tips of the branches; flowers white, yellowish white, or cream; calyx lobes spinulose (roseate gilia) <i>Ipomopsis roseata</i> <pg #>
40b	Leaves 1–10 cm long, usually not spinulose tipped; flowers yellow...41
41a (40b)	Usually grows in sandstone crevices or on rocky slopes; herbage sometimes with a sage-like odor when crushed; upper leaves linear or linear oblanceolate; lower leaves trifid or pinnately 5-cleft;

- 1340–2000 m; western Kane and eastern Washington cos. (Ruth's
sphaeromeria) ***Sphaeromeria ruthiae* <pg #>**
- 41b Substrate varies, usually sandy or gravelly soils; herbage lacks a sage-
like odor; leaves linear filiform, mostly pinnatifid, but the uppermost
leaf sometimes entire; widely distributed; 1000–2200 m (hairy sene-
cio) ***Senecio flaccidus* var. *flaccidus* <pg #>**
- 42a (39b) Leaves green, hairy above, yellow to rust colored below, clustered
to some degree, the margins revolute, the base cuneate, 3–5-
lobed; bark grayish white, tomentose, peeling or scaly (Apache
plume) ***Fallugia paradoxa* <pg #>**
- 42b Leaves not yellow or rust colored below; other characters may
vary **43**
- 43a (42b) Leaves glandular punctate above, white tomentose below,
the margins revolute, the base cuneate, mainly 5 lobed; bark
shreddy; branches glandular; 820–2800 m; widespread (cliffrose)
..... ***Purshia stansburyana* <pg #>**
- 43b Leaves not glandular punctate; branchlets white; leaves pinnati-
fid to bipinnatifid, with rounded tips up to 3 cm long, uniformly
strigose hairy on both sides; 670–1000 m; Washington Co. (bur-
sage) ***Ambrosia dumosa* <pg #>**
- 44a (38b) Usually found on limestone cliff crevices (sometimes quartzite); herb-
age sometimes with a sage-like odor when crushed; endemic to the
Great Basin (false sagebrush) ***Sphaeromeria diversifolia* <pg #>**
- 44b Substrate various; herbage lacking a sage-like odor; distribution vari-
ous **45**
- 45a (44b) Plants seldom woody above the base; stems and leaves not particu-
larly glaucous **46**
- 45b Plants subshrubs, but definitely woody above the base; glaucous, at
least on new growth **47**
- 46a (45a) Leaves mostly basal or basal and cauline (the basal leaves not al-
ways apparent), the uppermost leaf simple, the lower or basal leaves
pinnatifid, the segments neither filiform nor linear (Jones' pepper-
plant) ***Lepidium montanum* var. *jonesii* <pg #>**
- 46b Leaves spread somewhat evenly along the stem, pinnatifid or simple,
linear or filiform (glabrous senecio)
..... ***Senecio flaccidus* var. *monoensis* <pg #>**
- 47a (45b) Longest leaves to 18 cm long, basal, cauline, the upper leaves some-
times entire, the lower leaves pinnatifid (desert plume)
..... ***Stanleya pinnata* <pg #>**
- 47b Longest leaves to 6 cm long, all cauline **48**
- 48a (47b) Stems glabrous; 700–1525 m; Washington Co. (Frémont's pepper-
plant) ***Lepidium fremontii* <pg #>**

48b	Stems of the current year minutely puberulent; 2225–2960 m; Uinta Co. (Huber's pepperplant) <i>Lepidium huberi</i> <pg #>
49a (36b)	Mature plants usually less than 3 dm tall, suffrutescent 50
49b	Mature plants usually more than 3 dm tall (unless grazed or in dry conditions), not suffrutescent..... 51
50a (49a)	Young stems loosely villous, sometimes inconspicuously glandular; heads discoid; limestone and Navajo sandstone; Kane and Washington cos. (Jones' rock daisy) <i>Perityle tenella</i> <pg #>
50b	Young stems glandular scabrous or stipitate glandular; heads radiate; outcrops of limestone and ash-flow tuff; plants of the Great Basin (Stansbury's rock daisy) <i>Perityle stansburii</i> <pg #>
51a (49b)	Leaves pinnately veined 52
51b	Leaves palmately veined 64
52a (51a)	Leaves more or less tomentose on 1 or both sides 53
52b	Leaf hairs stiff, short, star shaped, or lacking, but not tomentose.... 57
53a (52a)	Leaves thick, leathery, evergreen, the margins revolute, usually dark green, at least on the upper side; most leaves fascicled 54
53b	Leaves usually not thick and leathery, the margins sometimes revolute 56
54a (53a)	Leaves not punctate glandular, usually 3 lobed apically, rarely 5 lobed; blade thinly pubescent above, white tomentose below; flowers yellow, the petals 4–7 mm long; pistils 1–2(3); styles not elongate or plumose (bitterbrush) <i>Purshia tridentata</i> <pg #>
54b	Leaves conspicuously punctate glandular, 3–7 lobed; pistils 1–5... 55
55a (54b)	Leaves 5–7 lobed; flower petals 7–14 mm long; pistils 4–10; styles elongate, plumose (cliffrose)..... <i>Purshia stansburyana</i> <pg #>
55b	Leaves 3(5) lobed; flower petals 3–6(9) mm long; pistils 1–2(3); styles somewhat elongated, not plumose (glandular bitterbrush)..... <i>Purshia glandulosa</i> <pg #>
56a (53b)	Leaf margins more or less revolute, the larger lobes occurring near the leaf base; petioles winged; crushed leaves have a pine-like odor; stream, gravels, and terraces; Washington Co. (woolly bur-sage) <i>Ambrosia eriocentra</i> <pg #>
56b	Leaf margins not revolute, the lobes evenly distributed along the margins; aromatic but not pine-like; crevices in limestone cliffs; Wash-ington Co. (mariola) <i>Parthenium incanum</i> <pg #>
57a (52b)	Largest leaves usually less than 2.5 cm long 58
57b	Largest leaves usually more than 2.5 cm long..... 60

- 58a (57a) Leaves obovate or oblanceolate, the base cuneate, most occurring on spur branches, the secondary veins prominent; bark shreddy (mountain spray) ***Holodiscus dumosus* <pg #>**
- 58b Leaves ovate to suborbicular, the base truncate to rounded, usually not occurring on spur branches, the secondary veins not especially prominent; bark not shreddy **59**
- 59a (58b) Leaves densely glandular villous, not glabrous, the primary veins 1–3, arising from the base of the leaf, sessile or short petioled; wand-like branching; plants 2–7 dm tall (littleleaf brickell-bush)..... ***Brickellia microphylla* <pg #>**
- 59b Leaves glabrous to puberulent, the primary veins usually 1, petiolate; intricate branching; 5–25 dm tall (simpleleaf squawbush)..... ***Rhus aromatica* var. *simplicifolia* <pg #>**
- 60a (57b) Most leaves less than 3.5 cm long, ovate to oblanceolate, the base cuneate, toothed above the distal 1/2 of the leaf, pilose above; lateral veins prominent; bark shreddy; fruit an achene (mountain spray) ***Holodiscus dumosus* <pg #>**
- 60b Longest leaves usually more than 3.5 cm, sometimes with stellate hairs on both surfaces, becoming glossy with age; lateral veins sometimes prominent; fruit an acorn **61**
- 61a (60b) Leaves to 5.5 cm long and 3.3 cm wide, both sides similar in color when mature; 6–10 tooth-like lateral lobes, the tips apiculate to acuminate; sandy soils of Emery, Garfield, Grand, Kane, San Juan, and Wayne cos.; 1125–2135 m (Havard oak).... ***Quercus havardii* <pg #>**
- 61b Leaves larger than above, mature leaves slightly paler below; plants not usually in sandy soils..... **62**
- 62a (61b) Leaf sinuses not obliquely descending; leaves with 4–8 tooth-like lateral lobes, usually sharp pointed; semi-evergreen; western Utah (hybrid) ***Quercus gambelii* × *Q. turbinella* <pg #>**
- 62b Leaf sinuses obliquely descending 1/4–3/4 the distance to the midrib, sometimes more **63**
- 63a (62b) Largest leaves up to 17 cm long, the sinuses 1/4–3/4 or more the distance to the midrib, the lobes rounded, obtuse, or bilobed; deciduous; all Utah counties (Gambel oak) ***Quercus gambelii* <pg #>**
- 63b Largest leaves up to 8.5 cm long, the sinuses less than 1/2 the distance to the midrib; semi-evergreen; Garfield, Grand, Kane, and San Juan cos. (hybrid) ***Quercus gambelii* × *Q. havardii* <pg #>**
- 64a (51b) Leaf blade 10–25 cm long and about as wide, the lobes (3)5–7, acute; fruit red, raspberry-like (thimbleberry) ***Rubus parviflorus* <pg #>**
- 64b Leaf blade less than 10 cm long **65**

65a (64b)	Stipules present, lanceolate ovate, serrate or entire, usually persistent; leaves green above, white tomentose below; San Juan Co; 1130–1160 m (New Mexico thimbleberry) <i>Rubus neomexicanus</i> <pg #>
65b	Stipules lacking or, if present, adnate to the petiole or membranous and deciduous 66
66a (65b)	Leaves usually with some stellate hairs; stipules membranous and deciduous; bark exfoliating on older twigs; fruit a follicle 67
66b	Leaves lacking stellate hairs; stipules lacking or adnate to the petiole; fruit a drupe or a berry 69
67a (66a)	Largest leaf blades less than 2 cm long; pistil and style solitary (dwarf ninebark)..... <i>Physocarpus alternans</i> <pg #>
67b	Largest leaf blades more than 2 cm long; pistil and style 2–3 68
68a (67b)	Leaf blades usually 2–8 cm long; widespread (mallow ninebark) <i>Physocarpus malvaceus</i> <pg #>
68b	Leaf blades usually 0.7–2.5 cm long; Carbon, Sevier, Utah, and Wasatch cos. (mountain ninebark)..... <i>Physocarpus monogynus</i> <pg #>
69a (66b)	Leaves pinnately to subpalmately lobed; fruit a reddish drupe; dry sites, often on rimrock; Emery, Garfield, Grand, Kane, Millard, San Juan, Tooele, Washington, and Wayne cos.; 975–1925 m (simpleleaf squawbush)..... <i>Rhus aromatica</i> var. <i>simplicifolia</i> <pg #>
69b	Leaves palmately veined and lobed; fruit a berry; mostly temperate or cool regions; 1340–3390 m 70
70a (69b)	Stems weak, trailing, almost vine-like; plants usually less than 7 dm tall; leaves mostly glabrate on the upper surface, glabrous, puberulent, or with glands on the lower surface; flowers purple to reddish green; berries purplish or black; Deep Creek Mountains (trailing black currant)..... <i>Ribes laxiflorum</i> <pg #>
70b	Stems usually strong, erect; mature plants usually more than 7 dm tall; flowers not purple 71
71a (70b)	Young stems, leaves, and fruit with conspicuous, sessile, round yellow glands; leaves 2.5–15 cm wide, doubly crenate or doubly serrate, usually not fascicled; flowers white; fruit blackish, sometimes glaucous; sometimes strongly aromatic; Box Elder, Duchesne, Salt Lake, Summit, Utah, and Wasatch cos. (northern black currant) <i>Ribes hudsonianum</i> <pg #>
71b	Foliage glabrous, hairy, or glandular; leaves often fascicled..... 72
72a (71b)	Youngest stems usually not stipitate glandular, mostly glabrous or glabrate (some with prickles); leaf base usually truncate, subcordate, or cuneate 73
72b	Youngest stems densely to sparingly stipitate glandular, sometimes hairy to some degree; leaf base usually cordate, subcordate, or truncate.... 74

- 73a (72a) Young stems tan to orange at first, spines lacking; leaves glabrous, usually 3 lobed, the sinuses usually less than 1/2 the distance to the base; terminal lobe with 3 major veins becoming almost parallel; margins of the lobes entire to coarsely crenate to dentate; petiole finely pubescent to glabrous; flowers showy yellow, sometimes reddish; berries red, orange, golden, or black, glabrous (golden currant) ***Ribes aureum* <pg #>**
- 73b Young stems white to green or tan; nodal spines 1–3 or lacking; leaves glabrous to glabrate, the hairs sometimes along the veins or the leaf margins, 3–5 lobed, the sinuses sometimes extending more than 1/2 the distance to the base; margins crenate dentate; petiole tomentose pilose or glandular pubescent; flowers white, often with red veins; berries red to greenish purple or black, glabrous (whitestem gooseberry) ***Ribes inerme* <pg #>**
- 74a (72b) Most leaves less than 2.5 cm long and 3 cm wide; margins finely crenate dentate; leaves 0–7-lobed, the sinuses narrow, the base subcordate to truncate; leaf surface glandular to minutely hairy or glabrous; flowers white to cream; berries bright red or orange (wax currant) ***Ribes cereum* <pg #>**
- 74b Most leaves more than 2.5 cm long and 3 cm wide, the sinuses broad, the base usually cordate; margins singly to doubly toothed; berries black, bluish, or purplish black, sometimes glaucous and stipitate glandular..... **75**
- 75a (74b) Stipules usually free of the petiole at their tips; mature leaves mostly glabrous, sometimes hairy, but not stipitate glandular above, with inconspicuous, sessile, clear crystalline glands below; veins sometimes prominent below and impressed above; flowers cream, yellow green, or pinkish; Carbon, Emery, Grand, Juab, Millard, Salt Lake, San Juan, Sanpete, Sevier, Tooele, and Utah cos. (Rothrock's currant) ***Ribes wolfii* <pg #>**
- 75b Stipules lacking or, usually, fused to the petiole throughout; leaves sparingly or densely stipitate glandular, finely tomentose on both surfaces, aromatic, sticky to the touch; flowers white or cream; berries bluish black (sticky currant) ***Ribes viscosissimum* <pg #>**
- 76a (35b) Mature leaves whitish or silvery tomentose on 1 or both sides (with conspicuous, copious soft hairs, the hairs matted, woolly, or appressed, more or less obscuring the surface of the leaf); leaves sometimes appearing terete if they are so revolute that the tomentose underside does not show **77**
- 76b Mature leaves not as above; hairs, if present, usually short, sometimes stiff or rough, or, if longer, dense or sparse but not obscuring the leaf surface **130**
- 77a (76a) Leaves in loose, mostly basal rosettes; flowers yellow to pale yellow (sulfur flower) ***Eriogonum umbellatum* <pg #>**

77b	Leaves not restricted to loose rosettes, but also on the stem.....	78
78a (77b)	Flowering stems and branches of the inflorescence grooved and angled, densely and intricately branched, or, if terete, with short spinose lateral branches; leaves 5–15 mm long, soon deciduous; usually on limestone cliffs and outcrops; Beaver Dam Mountains, Washington Co; 1220–2135 m (limestone buckwheat).....	<i>Eriogonum heermannii</i> var. <i>sulcatum</i> <pg #>
78b	Flowering stems and branches of the inflorescence not grooved or angled, not spinose	79
79a (78b)	Leaves more or less revolute.....	80
79b	Leaves usually plane, sometimes crenate, undulate, or, if dry, sometimes slightly revolute	102
80a (79a)	Upper surface of the leaf glutinous; veins on the lower surface conspicuous (Yerba Santa).....	<i>Eriodictyon angustifolia</i> <pg #>
80b	Upper surface of the leaf not glutinous.....	81
81a (80b)	Leaves fascicled (if difficult to determine, try both ways)	82
81b	Mature leaves usually 1 per node	89
82a (81a)	Plants densely covered with star-shaped unbranched hairs, often becoming rust colored with age; fruits covered with long silky hairs (winterfat).....	<i>Krascheninnikovia lanata</i> <pg #>
82b	Plants not as above in most ways	83
83a (82b)	Leaves usually 2–6 cm long, tightly revolute, the lower surface almost obscured; stems of the inflorescence densely branched, usually glabrous; San Juan Co.; 1700 m (slenderleaf buckwheat).....	<i>Eriogonum leptophyllum</i> <pg #>
83b	Leaves usually less than 3 cm long; other characters may vary	84
84a (83b)	Stems with a reddish or brownish tomentum; plants usually less than 8 cm tall.....	85
84b	Stems sometimes tomentose, but, if so, not reddish or brownish; plants usually more than 8 cm tall at maturity	86
85a (84a)	Leaves linear, 4–6 mm long and 0.8–1.2 mm wide; Juab and Millard cos.; tuffaceous outcrops (scarlet buckwheat).....	<i>Eriogonum microthecum</i> var. <i>phoeniceum</i> <pg #>
85b	Leaves linear oblanceolate to narrowly elliptic or clavate, 5–15(20) mm long and 1–3 mm wide, the lower surface sometimes obscured by the leaf margins; Carbon, Emery, Garfield, Grand, San Juan, Sevier and Wayne cos. (pretty buckwheat).....	<i>Eriogonum bicolor</i> <pg #>
86a (84b)	Plants usually less than 2 dm tall; leaves 0.5–2 mm wide; stems of the inflorescence glabrous or thinly tomentose; perianth glabrous; San Juan Co.; 1325–1680 m (Comb Wash buckwheat).....	<i>Eriogonum clavellatum</i> <pg #>

- 86b Plants usually more than 2 dm tall; stems of the inflorescence usually tomentose, rarely glabrous; perianth glabrous or pubescent; distribution various**87**
- 87a (86b) Leaves narrowly elliptic, 1–2 mm wide; 1125–2900 m (Simpson's buckwheat) *Eriogonum microthecum* var. *simpsonii* <pg #>
- 87b Leaves usually oblanceolate, occasionally elliptic or linear, usually 2–15 mm wide.....**88**
- 88a (87b) Leaves 1–5 mm wide, the margins entire; perianth pubescent; Washington Co; 700–1500 m (Mojave buckwheat)
..... *Eriogonum fasciculatum* <pg #>
- 88b Leaves 5–45 mm wide, often wavy margined; perianth glabrous; eastern and southern Utah, but not Washington Co.; 1400–2400 m (crisp-leaf buckwheat)
..... *Eriogonum corymbosum* var. *corymbosum* <pg #>
- 89a (81b) Mat-forming alpine shrubs; leaves with crenate margins; petioles glabrous or sparingly villous, often with purple stipitate glands; 3500–3965 m (mountain avens)..... *Dryas octopetala* <pg #>
- 89b Plants sometimes low, but usually not mat forming; stipitate glands lacking; usually below 3500 m.....**90**
- 90a (89b) Mature plants usually less than 3 dm tall.....**91**
- 90b Mature plants 2–15 dm tall**95**
- 91a (90a) Lateral branches glabrous and spinulose; leaves without persistent leaf bases; caudex stems absent; stems sometimes faintly lined or grooved; south end of the Beaver Dam Mountains, Washington Co.; limestone outcrops and gravel; 1030–1500 m (Tableau Peak buckwheat)..... *Eriogonum heermannii* var. *subspinosum* <pg #>
- 91b Branches more or less tomentose, not spinulose.....**92**
- 92a (91b) Stems with a reddish or brownish tomentum; plants 1–12 cm tall. **93**
- 92b Tomentum, if present, not reddish or brownish; plants 5–20 cm tall..
.....**94**
- 93a (92a) Leaves linear, 4–6 mm long and 0.8–1.2 mm wide; Juab and Millard cos.; tuffaceous outcrops (scarlet buckwheat)
..... *Eriogonum microthecum* var. *phoeniceum* <pg #>
- 93b Leaves linear oblanceolate to narrowly elliptic or clavate, 5–15(20) mm long and 1–3 mm wide, the lower surface sometimes obscured by the leaf margins; Carbon, Emery, Garfield, Grand, San Juan, Sevier and Wayne cos. (pretty buckwheat)..... *Eriogonum bicolor* <pg #>
- 94a (92b) Stems of the inflorescence tomentose; flowers yellow; Grand Co. (Grand buckwheat)..... *Eriogonum contortum* <pg #>

94b	Stems of the inflorescence glabrous or thinly tomentose; flowers white, suffused with pink; San Juan Co. (Comb Wash buckwheat)..... <i>Eriogonum clavellatum</i> <pg #>
95a (90b)	Inflorescence somewhat racemose; leaves often deciduous at flowering; sandy soils in Emery, Garfield, Kane, San Juan, and Wayne cos.; 1310–1770 m (sand buckwheat) <i>Eriogonum leptocladon</i> <pg #>
95b	Inflorescence dichotomous and cymose; leaves usually present at flowering; habitat and distribution various..... 96
96a (95b)	Flowering stems and inflorescence glabrous to sparsely tomentose 97
96b	Flowering stems and inflorescence more and less tomentose, rarely glabrous 99
97a (96a)	Leaves tightly revolute, almost obscuring the lower surface; inflorescence densely branched; San Juan Co; 1700 m (slenderleaf buckwheat)..... <i>Eriogonum leptophyllum</i> <pg #>
97b	Leaves loosely revolute or plane; other characters may vary 98
98a (97b)	Leaves 2–11 cm long, lanceolate to elliptic; petiole 3–20 mm long (longleaf buckwheat) <i>Eriogonum lonchophyllum</i> <pg #>
98b	Leaves 2–4 cm long, usually elliptic; petiole 5–8 mm long; gravelly slopes; 1000–1100 m; Shivwits Hill near Castle Cliffs, Washington Co. (golden buckwheat) <i>Eriogonum corymbosum</i> var. <i>aureum</i> <pg #>
99a (96b)	Leaves linear lanceolate to lanceolate, the longest leaves usually more than 5 cm long and less than 8 mm wide, the margins seldom crenulate; Duchesne Co; 2040–2600 m (Gate Canyon buckwheat)..... <i>Eriogonum hylophilum</i> <pg #>
99b	Leaves lanceolate, oblong, ovate, or elliptic to nearly orbicular, usually less than 5 cm long and often more than 8 mm wide, the margins often crenulate 100
100a (99b)	Leaf blades densely silvery tomentose, at least on the upper surface, 3–5 cm long; Wellington area, Carbon and Emery cos.; 1500–1800 m (lanceleaf buckwheat) <i>Eriogonum lancifolium</i> <pg #>
100b	Leaf tomentum white, tan, or brownish 101
101a (100b)	Leaves usually more than 2 mm wide; widespread (buckwheat) <i>Eriogonum corymbosum</i> <pg #>
101b	Leaves 1–2 mm wide; eastern and southwestern Utah; 1125–2900 m (Simpson’s buckwheat) <i>Eriogonum microthecum</i> var. <i>simpsonii</i> <pg #>
102a (79b)	Mat-forming alpine shrub; leaves with crenate margins; petioles glabrous or sparingly villous, often with purple stipitate glands; flowers white; 3500–3965 m (mountain avens) <i>Dryas octopetala</i> <pg #>

- 102b Below 3500 m; other characters may vary.....**103**
- 103a (102b) Leaves in loose rosettes; flowers yellow to pale yellow (sulfur flower) *Eriogonum umbellatum* <pg #>
- 103b Leaves not in loose rosettes; flowers yellow, white, or occasionally pink**104**
- 104a (103b) Leaves somewhat fascicled, at least on older stems**105**
- 104b Leaves usually not fascicled**110**
- 105a (104a) Stems covered with a matted resinous tomentum (this may be difficult to see, so scrape the surface of the stems to determine the presence of matted hairs) (rabbitbrush)..... *Ericameria nauseosa* <pg #>
- 105b Stems not as above.....**106**
- 106a (105b) Leaves with a densely reddish-brown tomentum below, 3–8 mm long; mature plants usually less than 1.5 dm tall; Juab and Washington cos. (Pahute Mesa buckwheat).....
..... *Eriogonum microthecum* var. *lapidicola* <pg #>
- 106b Leaves without a reddish-brown tomentum below; mature plants usually more than 1.5 dm tall**107**
- 107a (106b) Inflorescence more or less racemose; upper Beaver Dam and Mangane washes; Washington Co.; 1190–1750 m (Wright’s buckwheat)..... *Eriogonum wrightii* <pg #>
- 107b Inflorescence cymose; more widely distributed**108**
- 108a (107b) Branchlets sometimes tomentose, but lacking glabrate streaks below the primary leaves; leaves usually 0.5–2.5 cm long, usually elliptic; plants 1–4 dm tall; involucre dichotomously arranged; flowers white to pink; northern and northwestern Utah; 1125–2900 m (basin buckwheat)..... *Eriogonum microthecum* var. *laxiflorum* <pg #>
- 108b Branchlets white pannose, with glabrous streaks below the primary leaves; leaves 5–40 mm long, not elliptic; flowers yellow, in discoid heads**109**
- 109a (108b) Primary leaves spine tipped, 5–15 mm long, soon deciduous, linear and tomentose, differing in shape from the secondary (axillary) leaves, which are linear to spoon shaped and glabrous (littleleaf horsebrush) *Tetradymia glabrata* <pg #>
- 109b Primary leaves not spinescent, 5–40 mm long, linear to oblanceolate, tomentose, similar to the secondary leaves, but shorter and wider (gray horsebrush)..... *Tetradymia canescens* <pg #>
- 110a (104b) Leaves less than 3 mm wide**111**
- 110b Leaves more than 3 mm wide.....**115**
- 111a (110a) Mature leaves usually less than 2.5 cm long, often fleshy, linear to semiterete or flat, up to 25 mm long, sessile, some opposite; usually on saline soils**112**

- 111b Mature leaves often more than 2.5 cm, not fleshy, linear to narrowly oblong, up to 70 mm long, often greener than the twigs.....113
- 112a (111a) Mature plants usually 0.5–3(4.5) dm tall; leaves 1–2 mm wide, linear, semiterete, fleshy; saline habitats (gray molly)
.....*Kochia americana* <pg #>
- 112b Mature plants usually 1–7.5 dm tall; leaves usually less than 1 mm, flat, not particularly fleshy (forage kochia)
.....*Kochia prostrata** <pg #>
- 113a (111b) Leaves 1–3-nerved from the base, green, sometimes slightly tomentose, stipitate glandular; stems pannose tomentose; tomentum sometimes glandular resinous (Parry’s rabbitbrush)..... *Ericameria parryi* <pg #>
- 113b Leaves 1-nerved, not stipitate glandular; stems tomentose; tomentum sometimes resinous114
- 114a (113b) Inflorescence cymose, on short peduncles; pappus of bristles; plants 4–12 dm tall, somewhat fastigate; leaves often ascending (rabbitbrush)..... *Ericameria nauseosa* <pg #>
- 114b Flowers in solitary heads, on long peduncles; pappus of scales; plants 3–6 dm tall; leaves sometimes thinly tomentose, greener than the stems; 500–1225 m; Kane and Washington cos. (whitestem paperflower) *Psilostrophe cooperi* <pg #>
- 115a (110b) Leaves usually less than 2 times longer than wide, ovate, orbicular, obovate, or broadly elliptic116
- 115b Leaves usually 2 or more times longer than wide, linear, elliptic, lanceolate, or oblanceolate.....120
- 116a (115a) Leaves 2–8 cm long, clustered at the top of the current stem, ovate, entire, or toothed, aromatic; 1220 m; Washington Co. (brittlebush).....*Encelia farinosa* <pg #>
- 116b Leaves usually 1–3(4.5) cm long, leaves not clustered at the tips of the new growth; distribution various117
- 117a (116b) Stems of the inflorescence glabrous; leaves usually less than 2 cm long, broadly elliptic, basal or sheathing in the lower 1/4 of the flowering stem; plants usually less than 4 dm tall; 1460–1830 m; endemic to Millard Co. (lbex buckwheat) *Eriogonum ammphilum* <pg #>
- 117b Stems of the inflorescence tomentose; longest leaves usually more than 2 cm long; mature plants usually 2–15 dm tall; distribution various ..
.....118
- 118a (117b) Leaves broadly ovate to orbicular, 10–30 mm wide; plants 5–15 dm tall; Garfield, Grand, Kane, San Juan, and Wayne cos.; 1100–2200 m (roundleaf buckwheat).....
..... *Eriogonum corymbosum* var. *orbiculatum* <pg #>
- 118b Leaves lanceolate to broadly oblanceolate to elliptic, rarely orbicular, usually less than 17 mm wide; plants 3–10 dm tall119

- 119a (118b) Stems usually erect; leaf margins plane or crenate; inflorescence usually cymose; eastern and southern Utah; 1400–2400 m (buckwheat) *Eriogonum corymbosum* <pg #>
- 119b Stems decumbent to sprawling; leaf margins undulate or plane; inflorescence more or less racemose; Juab, Kane, Millard, Tooele, and Washington cos.; 1090–1990 m (coin buckwheat) *Eriogonum nummulare* <pg #>
- 120a (115b) Plants of mountain meadows near streams; hairs more appressed than tomentose (Wolf's willow) *Salix wolfii* <pg #>
- 120b Plants of drier habitats **121**
- 121a (120b) Stems white pannose, with glabrate streaks below the primary leaves (gray horsebrush) *Tetradymia canescens* <pg #>
- 121b Stems not as above **122**
- 122a (212b) Stems with the tomentum impregnated with resin (rabbit-brush) *Ericameria nauseosa* <pg #>
- 122b Tomentum, if present, not impregnated with resin **123**
- 123a (122b) Inflorescence more or less racemose; flowers white **124**
- 123b Inflorescence cymose; flowers white or otherwise **125**
- 124a (123a) Leaf blades usually linear lanceolate to narrowly oblong to elliptic; sandy soils of Emery, Garfield, Grand, Kane, San Juan, and Wayne cos. (sand buckwheat) *Eriogonum leptoclodon* <pg #>
- 124b Leaf blades broadly oblanceolate to broadly elliptic, the margins plane or undulate; Juab, Kane, Millard, Tooele, and Washington cos. (coin buckwheat) *Eriogonum nummulare* <pg #>
- 125a (123b) Branches of the inflorescence more or less tomentose **126**
- 125b Branches of the inflorescence glabrous **128**
- 126a (125a) Leaves linear lanceolate to lanceolate, the longest leaves usually more than 5 cm long and less than 8 mm wide, the margins seldom crenulate; Duchesne Co; 2040–2600 m (Gate Canyon buckwheat) *Eriogonum hylophilum* <pg #>
- 126b Leaves lanceolate, oblanceolate, or elliptical to nearly orbicular, usually 5 cm or less long and more than 8 mm wide, the margins often crenulate **127**
- 127a (126b) Leaf blades densely silvery tomentose, at least on the upper surface, 3–5 cm long; 1500–1800 m; Wellington area, Carbon and Emery cos. (lanceleaf buckwheat) *Eriogonum lancifolium* <pg #>
- 127b Leaf tomentum white, tan, or brownish; widespread (buckwheat) *Eriogonum corymbosum* <pg #>

128a (125b)	Leaves 2–11 cm long, linear to elliptic, lanceolate, or ob-lanceolate, the margins entire to crenate, plane to revolute, basal to cauline; flowers white; eastern Utah (longleaf buck-wheat)..... <i>Eriogonum lonchophyllum</i> <pg #>
128b	Leaves 2–4 cm long, usually elliptic; Millard and Washington cos. 129
129a (128b)	Leaves basal or sheathing up the lower 1/4 of the flower-ing stem; petioles 1–5(10) mm long; flowers white; sandy flats, washes, and dunes; 1450–1850 m; Millard Co. (ibex buck-wheat)..... <i>Eriogonum ammophilum</i> <pg #>
129b	Leaves cauline for 1/2 or more the length of the flowering stem; petioles 5–8 mm long; flowers yellow to pale yellow, rarely white; gravelly slopes of Shivwits Hill near Castle Cliffs, Washington Co; 1000–1100 m (golden buckwheat)..... <i>Eriogonum corymbosum</i> var. <i>aureum</i> <pg #>
130a (176b)	Branchlets deciduous; leaves scale-like, sessile, somewhat appressed, 1–3 mm long and less than 0.5 mm wide; long slender branches, with reddish-brown bark; flowers pink to white; forms thickets along stream courses, lakes, ditch banks, etc. in habitats usually below 2300 m (tamarisk) <i>Tamarix chinensis</i> <pg #>
130b	Branchlets not deciduous 131
131a (130b)	Leaf buds covered with 1 nonresinous cap-like scale; flowers in cat-kins; seeds with down attached; usually moist or wet habitats (wil-lows) 132
131b	Leaf buds with more than 1 scale; other characters and habitat may vary..... 152
132a (131a)	Mat forming; typically less than 10 cm tall; usually near or above timberline 133
132b	Not mat forming; typically well over 10 cm tall..... 135
133a (132a)	Mature leaves oval to orbicular, sometimes elliptic, usually less than 2.5 times longer than wide, glaucous below, somewhat leathery, con-spicuously reticulate veined; tips usually rounded or obtuse (snow willow)..... <i>Salix reticulata</i> <pg #>
133b	Mature leaves usually elliptic, usually 2 or more times longer than wide, not leathery; tips usually pointed 134
134a (133b)	Mature leaves glaucous below, mostly elliptic, usually 2–3 times lon-ger than wide; secondary veins prominent; petioles 2–12 mm long (arctic willow) <i>Salix arctica</i> <pg #>
134b	Mature leaves not glaucous, or only slightly so, narrowly elliptic, usually 2.5–7 times longer than wide; secondary veins not par-ticularly prominent; petioles less than 3 mm long (Cascades wil-low) <i>Salix cascadiensis</i> <pg #>

- 135a (132b) Leaf blades linear, usually 6 or more times longer than wide, entire to toothed, sessile or short petiolate; petioles usually less than 6 mm long**136**
- 135b Leaf blades narrowly elliptic or wider, mostly less than 6 times longer than wide, mostly finely toothed or entire; petioles typically longer ..
.....**137**
- 136a (135a) Mature leaves usually hairy, dull green to grayish or silvery; veins not conspicuous; riparian habitat and other moist sites; mostly basins and foothills; 825–2590 m; all Utah counties (sandbar willow)***Salix exigua* <pg #>**
- 136b Mature leaves mostly glabrous, deep green, typically conspicuously veined; rocky streambanks; foothills to mountains; up to 3050 m; northern Utah (dusky willow)***Salix melanopsis* <pg #>**
- 137a (135b) Current branchlets glaucous or pruinose**138**
- 137b Current branchlets not glaucous or pruinose**140**
- 138a (137a) Mature plants usually less than 1.5 m tall; epidermis of the internodes exfoliating in translucent flakes (gray willow)***Salix glauca* <pg #>**
- 138b Mature plants usually more than 1.5 m tall; bark seldom exfoliating.
.....**139**
- 139a (138b) Mature leaves with dense silvery hairs below, not easily rubbed off, dark green and glabrous above; margins sometimes slightly revolute; leaves up to 9 cm long and 3 cm wide (Drummond's willow)***Salix drummondiana* <pg #>**
- 139b Mature leaves sparsely pubescent to glabrous, the lower surface with appressed, easily removed, often rust-colored or yellowish silky hairs; margins not revolute; leaves up to 8 cm long and 1.5 cm wide (Geyer's willow)***Salix geyeriana* <pg #>**
- 140a (137b) Petiole with glands near the base of the blade; mature leaves with long acuminate tips (whiplash willow)***Salix lucida* <pg #>**
- 140b Petiole lacking glands near the base of the blade.....**141**
- 141a (140b) Leaves glaucous below, or the lower surface much lighter, due to dense hairs obscuring the surface.....**142**
- 141b Leaves not glaucous (sometimes lighter, but not glaucous); if the lower surface is obscured by hairs, the hairs are equally dense on both sides.....**150**
- 142a (141a) Current branches usually reddish brown or reddish purple, appressed hairy, occasionally glabrous; older branches sometimes appearing streaked, due to the cracked bark; mature buds usually with depressed margins; sometimes tree-like, up to 8 m tall; 1 to many stems, up to 1(1.5) dm thick; catkins pale yellow to light brown; capsules hairy, with long stipes (Bebb's willow)***Salix bebbiana* <pg #>**
- 142b Characteristics of branches, buds, etc. not as above in all ways...**143**

143a (142b)	Mature shrubs usually less than 1.5 m tall; bark of the lower stems exfoliating in translucent flakes; usually high montane to alpine 144
143b	Mature plants more than 1.5 m tall; bark usually not exfoliating 146
144a (143a)	Mature leaves glabrous, or nearly so (sometimes sparsely hairy below), deep green, shiny above, mostly elliptical, entire; twigs lustrous black, purplish black, or dark chestnut, rarely glaucous; year-old branchlets often reddish; 2255–3660 m (plane-leaf willow) <i>Salix planifolia</i> <pg #>
144b	Mature leaves usually pubescent on 1 or both sides, sometimes glabrate; twigs not as above 145
145a (144b)	Petioles usually less than 3 mm long, seldom exceeding the bud, often reddish; mature leaf blades 2–4 cm long, elliptic to obovate, oblong, or oval, hairy on both sides; plants usually associated with limestone; 2070–3440 m (short-fruit willow) <i>Salix brachycarpa</i> <pg #>
145b	Petioles usually more than 3 mm long, equal to or exceeding the bud, yellow or greenish; mature leaf blades 3–8 cm long, mostly elliptic, sparsely hairy to glabrous; branchlets rarely glaucous; plants sometimes low and prostrate; 2775–3660 m (gray willow).... <i>Salix glauca</i> <pg #>
146a (143b)	Twigs lustrous black, purplish black, or dark chestnut; year-old branches often red; mature leaves glabrous, or nearly so, deep green, shiny above, mostly elliptic, entire, or sometimes serrulate; plants 1.5–2(4) m tall; 2255–3660 m (plane-leaf willow) <i>Salix planifolia</i> <pg #>
146b	Twigs not as above; leaves green above, glaucous below; plants 3–6(12) m tall..... 147
147a (146b)	New branchlets usually glabrous, rarely pubescent; mature expanded leaves usually glabrous, if occasionally pubescent, then more so above than below..... 148
147b	New branchlets usually pubescent, sometimes becoming glabrous; young leaves densely hairy when young; mature leaves glabrate above, puberulent strigose or strigulose below, at least along the mid-vein, rarely glabrate..... 149
148a (147a)	Leaves lanceolate to elliptic, occasionally oblong to obovate, if lanceolate, the bases rounded to subcordate; tips acuminate to acute; margins entire to serrulate; midrib and petiole usually green; third-year bark ashy gray; 1340–2400 m; widespread (gray bark willow) <i>Salix eriocephala</i> <pg #>
148b	Leaves elliptic to obovate, occasionally ovate, the bases tapering; tips blunt to acute; margins serrate to crenate to entire; midrib and/or petiole often red; third-year bark not ashy gray; 2200–3200 m; LaSal and Abajo mountains (mountain willow)..... <i>Salix monticola</i> <pg #>

- 149a (147b) Leaves mostly oblanceolate to obovate; freshly stripped bark of the branchlets with a skunky odor; can occupy drier habitats than most willows; 1400–3355 m (Sculer’s willow) .. ***Salix scouleriana* <pg #>**
- 149b Leaves mostly oblong or narrowly elliptic to oblanceolate; bark of the branchlets lacking a skunky odor; streamsides, ditches, and washes below 2330 m (arroyo willow) ***Salix lasiolepis* <pg #>**
- 150a (141b) Leaves usually less than 2.5 times longer than wide, cordate, oval, elliptic, or nearly orbicular, crowded on short internodes, glabrous when fully expanded; 2550–3350 m (Arizona willow) ***Salix arizonica* <pg #>**
- 150b Leaves usually more than 2.5 times longer than wide, narrowly lanceolate to elliptic or oblanceolate to almost oval, the leaf blades more or less pubescent, some becoming glabrate with age **151**
- 151a (150b) Leaves permanently and usually densely hairy on both sides, entire; mature plants usually less than 1.5(2) m tall; bark of the lower stems often exfoliating in translucent flakes; 2470–3300 m (Wolf’s willow) ***Salix wolfii* <pg #>**
- 151b Leaves sparsely pubescent or glabrate at maturity (hairs present, but inconspicuous without a hand lens), entire, the margins toothed or partly glandular; mature plants usually more than 1.5 m tall; 2075–3170 m (Booth’s willow) ***Salix boothii* <pg #>**
- 152a (131b) Stems usually striate and angled, rarely terete, usually green; leaves 2 or more times longer than wide, usually glabrous, entire, serrulate, or coarsely serrate; flowers white, greenish, or yellow (if yellow, the plants usually less than 8 dm tall)..... **153**
- 152b Stems usually not striate and angled (if striate, then terete); other characters various. **164**
- 153a (152a) Leaves ovate to lanceolate or elliptic; conifer-aspen communities **154**
- 153b Leaves linear to linear oblanceolate or linear lanceolate; habitats vary..... **155**
- 154a (153a) Most leaves less than 12 mm long; twigs broom-like, sharply angled; grooves of the branches glabrous; fruit red (red whortleberry) ***Vaccinium scoparium* <pg #>**
- 154b Most leaves more than 12 mm long; twigs sharply angled, but seldom broom-like; grooves of the branches puberulent; fruit blue black (blue whortleberry) ***Vaccinium myrtillus* <pg #>**
- 155a (153b) Low rounded plants, usually less than 8 dm tall at maturity; xeric to mesic soils **156**
- 155b Mature plants usually more than 8 dm tall; washes, stream banks, ditch banks, seeps, sinks, and other moist habitats **162**
- 156a (155a) Leaves usually not gland dotted or resinous..... **157**

156b	Leaves usually gland dotted, resinous.....	160
157a (156a)	Leaves mostly 3-nerved (rock goldenrod).. <i>Petradoria pumila</i> <pg #>	
157b	Leaves otherwise.....	158
158a (157b)	Leaves basal and cauline; basal leaves crowded, more or less persistent, linear oblanceolate; cauline leaves shorter than the basal leaves and usually reduced upward; stems usually branched only above the middle; endemic to eastern Millard Co. (goldenrod snakeweed) <i>Gutierrezia petradoria</i> <pg #>	
158b	Leaves cauline (the lower cauline leaves sometimes small, fascicled).....	159
159a (158b)	Plants suffrutescent, woody only at the base, with a bushy broom-like habit; leaves usually absent at flowering, entire or serrulate, linear to narrowly lanceolate or oblanceolate; flowering heads greenish white; involucre bracts slender, pointed, with a green midstripe; achenes strongly 5–10-nerved; pappus sometimes pinkish or purplish, becoming brown; dry sandy soil; San Juan Co. (Wright's baccharis)..... <i>Baccharis wrightii</i> <pg #>	
159b	Plants woody well above the base; bark becoming whitish; leaves linear or spatulate, persistent at flowering; secondary leaves sometimes smaller and more or less fascicled; flowers bright yellow, fading to cream; involucre bracts wide, rounded, with a greenish subapical spot; achenes densely white woolly; usually on gravelly rocky soils; Kane, San Juan, and Washington cos. (rayless golden-head) <i>Acamptopappus sphaerocephalus</i> <pg #>	
160a (156b)	Flowering heads on peduncles; involucre 5–8 mm long; Duchesne and Uinta cos. (orchard snakeweed) <i>Gutierrezia pomariensis</i> <pg #>	
160b	Flowering heads sessile or subsessile; involucre 2–5(6) mm long	161
161a (160b)	Flowers 5–12 per head; flower heads turbinate; branching often restricted to the upper 1/4 of the stem (broom snakeweed) <i>Gutierrezia sarothrae</i> <pg #>	
161b	Flowers mostly 2–3(4) per head; flower heads cylindric; stems branching, usually along the upper 1/2 of the stem (small-head snake-weed)..... <i>Gutierrezia microcephala</i> <pg #>	
162a (155b)	Plants with a fastigiate habit; leaves withering and sparse at flowering; proximal leaves 10–35 mm long, obovate to broadly oblanceolate, 1-nerved; margins entire or irregularly serrate; distal leaves entire, the tips rounded to obtuse, sometimes acute; moist alkaline soils; Washington Co. (desert baccharis)..... <i>Baccharis sergiloides</i> <pg #>	

- 162b Plants not particularly fastigate; leaves numerous, well developed, present at flowering; longest leaves usually more than 35 mm long, 1–3-nerved, lanceolate, oblong to oblanceolate; leaf tips acute to acuminate or sometimes obtuse**163**
- 163a (162b) Leaf margins entire to irregularly and coarsely serrate on the distal 1/2; leaves oblong to narrowly oblanceolate, finely gland dotted, 2.5–7 cm long; achenes 8–10-nerved; stream banks, alkaline meadows, roadsides, and ditch banks (willow baccharis).....
.....***Baccharis salicina* <pg #>**
- 163b Leaf margins serrate, sometimes entire; leaves lanceolate, elliptic, sometimes oblong or linear oblanceolate, slightly falcate or willow-like, gland dotted, more or less resinous, 3–15 cm long; tips acute or acuminate; achenes 5-nerved (seepwillow)
.....***Baccharis salicifolia* <pg #>**
- 164a (152b) Most leaves less than 3 times longer than wide, usually ovate, obovate, cordate, orbicular, or deltoid, sometimes elliptic (if difficult to determine, try both ways)**165**
- 164b Most leaves more than 3 times longer than wide, usually lanceolate, oblanceolate, oblong, elliptic, or linear, semiterete**215**
- 165a (164a) Plants mat forming or prostrate.....**166**
- 165b Plants not mat forming**169**
- 166a (165a) Leaves white tomentose below; margins strongly revolute; petioles with black stipitate glands; alpine tundra, usually above 3500 m (mountain avens).....***Dryas octopetala* <pg #>**
- 166b Leaves not tomentose below; margins not revolute; petioles without glands; usually a ground layer in coniferous forests, below 3500 m ..
.....**167**
- 167a (166b) Plants nearly herbaceous (shrublet); leaf margins serrulate (alpine wintergreen).....***Gaultheria humifusa* <pg #>**
- 167b Plants more woody; leaf margins entire**168**
- 168a (167b) Leaves bright green on both sides, not glaucous; plants evergreen, stoloniferous; twigs puberulent, sometimes glandular, the bark exfoliating; berries red (kinnikinnick)***Arctostaphylos uva-ursi* <pg #>**
- 168b Leaves green above, pale or glaucous below; plants deciduous, not stoloniferous; twigs usually glabrous, the bark not exfoliating; berries blue (bog whortleberry)***Vaccinium uliginosum* <pg #>**
- 169a (65b) Mature plants usually less than 3 dm tall, some suffrutescent (if difficult to determine, try both ways)**170**
- 169b Mature plants usually more than 3 dm tall**182**

170a (169a)	Leaves usually deltoid, ovate; margins subentire to toothed or lobed, glandular and/or scabrous; base truncate to subcordate; mostly on open rocky slopes and in cliff crevices (limestone or sandstone), below 2400 m.....	171
170b	Leaves not as above	172
171a (170a)	Young stems glandular scabrous; heads radiate; outcrops of limestone and ash-flow tuff; plants of the Great Basin (Stansbury's rock daisy)	<i>Perityle stansburii</i> <pg #>
171b	Young stems loosely villous puberulent, scarcely glandular; heads discoid; limestone and Navajo sandstone; plants of the Colorado or Virgin River drainages (Jones' rock daisy)	<i>Perityle tenella</i> <pg #>
172a (170b)	Young stems and leaves stipitate glandular; leaves obovate, oblanceolate, oblong, or elliptic, less than 3 cm long, usually undulate or crisped; tips commonly apiculate or mucronate; flowers yellow.....	173
172b	Leaves not stipitate glandular, usually not undulate or crisped; other characters may vary.....	176
173a (172a)	Leaves with short stipitate or sessile glands, resinous.....	174
173b	Leaves with densely long stipitate glands.....	175
174a (173a)	Leaves oblong to oblanceolate, up to 3 cm long; tips acute to acuminate; margins more or less crisped; ray flowers absent; Millard and Washington cos.; 2400–3100 m (crisped goldenbush).....	<i>Ericameria crispa</i> <pg #>
174b	Leaves elliptical to obovate, up to 1.8 cm long; tips usually rounded, sometimes obtuse or acute; margins undulate; ray flowers present; rock crevices and talus; Beaver, Iron, and Millard cos.; 1600–2700 m (deer goldenbush)	<i>Ericameria cervina</i> <pg #>
175a (173b)	Leaves obovate to spatulate, up to 12 mm wide; disk flowers 5–15; open rocky soils in xeric sagebrush, pinyon-juniper, and ponderosa pine communities; Cache, Millard, Rich, Salt Lake, and Tooele cos.; 1500–3400 m (Rydberg's goldenbush)....	<i>Ericameria obovata</i> <pg #>
175b	Leaves elliptic to oblanceolate, up to 8 mm wide; disk flowers 15–25; rock outcrops in xeric sagebrush, pinyon-juniper, and ponderosa pine communities; Beaver and Millard cos.; 1300–3400 m (Watson's goldenbush)	<i>Ericameria watsonii</i> <pg #>
176a (172b)	Leaf margins usually somewhat revolute; leaves retrorsely scabrous to glabrous, narrowly oblanceolate to lanceolate, sometimes opposite or the upper leaves alternate; fruits a membranous circumscissile capsule; plants occasionally more than 3 dm tall; below 2000 m; Beaver, Garfield, Kane, and Washington cos. (rough menodora)	<i>Menodora scabra</i> <pg #>

- p>176b Leaf margins not revolute; leaf surface not scabrous; other characters
-
- may vary177
p>177a (176b) Leaves sometimes appearing whorled, subalternate, or basal, some-
-
- what leathery, persistent178
p>177b Leaves alternate, cauline, not appearing whorled or basal, not leath-
-
- ery, usually deciduous180
p>178a (177a) Leaves mostly basal, rarely cauline, ovate, oval, broadly elliptical, or
-
- orbicular; leaves green throughout, veins not white bordered (secund
-
- wintergreen)
- Pyrola secunda*
- <pg #>
p>178b Leaves alternate or appearing whorled, lanceolate, ovate, elliptic, or
-
- oblanceolate; leaves green, with white-bordered veins179
p>179a (177b) Leaves ovate; below 2100 m; Iron and Washington cos. (Menzies'
-
- chimaphila)
- Chimaphila menziesii*
- <pg #>
p>179b Leaves oblanceolate; above 2100 m; widespread (pipsissewa)
-
-
- Chimaphila umbellata*
- <pg #>
p>180a (177b) Twigs brownish, obscurely angled; leaves oblanceolate to obovate,
-
- the base cuneate, serrulate from the tip to below the middle; berries
-
- blue, glaucous (dwarf whortleberry)
-
-
- Vaccinium caespitosum*
- <pg #>
p>180b Twigs bright green, sharply angled181
p>181a (180b) Most leaves less than 12 mm long; twigs broom-like, sharply
-
- angled; grooves of the branches glabrous; fruit red (red whortle-
-
- berry)
- Vaccinium scoparium*
- <pg #>
p>181b Most leaves more than 12 mm long; twigs sharply angled, but seldom
-
- broom-like; grooves of the branches puberulent; fruit blue black (blue
-
- whortleberry)
- Vaccinium myrtillus*
- <pg #>
p>182a (169b) Largest mature leaves usually less than 3 cm long (if difficult to
-
- determine, try both ways)183
p>182b Largest mature leaves often more than 3 cm long197
p>183a (182a) Leaves 3-nerved from the base184
p>183b Leaves not 3-nerved from the base, or the veins not apparent188
p>184a (183a) Leaves elliptical to oval, glabrous to inconspicuously strigose, espe-
-
- cially on the veins below; margins entire, or serrulate toward the tip;
-
- branches low, rigid (Martin's ceanothus) ..
- Ceanothus martini*
- <pg #>
p>184b Leaves ovate to suborbicular, deltoid, or lanceolate ovate, scabrous,
-
- strigose, hispid; branches ascending185

- 185a (184b) Leaves sessile, or nearly so; blade 0.5–1.5(2) cm long and usually less than 1 cm wide, ovate to suborbicular, toothed to entire, sometimes lobed; stems much branched, pubescent, gland dotted; heads in loose panicle-like clusters at the ends of the branches; peduncles 2–10 mm long, glandular or viscid; flowers pale yellow, often purple tinged (littleleaf brickellbush) *Brickellia microphylla* <pg #>
- 185b Leaves petiolate (2–60 mm long); larger blades usually more than 1.5 cm long and more than 1 cm wide; other characters may vary
.....186
- 186a (185b) Leaf margins serrate to crenate; petioles 4–60 mm long; leaves ovate to deltoid, puberulent to glabrate, often gland dotted; stems glandular pubescent; peduncles 1–5 mm long, glandular pubescent; heads in leafy panicle-like clusters; involucre bracts striate; flowers pale yellow green (California brickellbush)..... *Brickellia californica* <pg #>
- 186b Leaf margins entire; petioles 2–7 mm long; stems not particularly glandular, sometimes glabrous or strigose to hispid, with pustular-based hairs; bark becoming fissured; heads solitary, on long peduncles; involucre bracts not striate; flowers yellow187
- 187a (186b) Leaves green, scabrous to strigose (not canescent); Washington Co. (Virgin brittlebush)..... *Encelia virginensis* <pg #>
- 187b Leaves gray green, canescent, sometimes strigose; southeastern Utah (resin brittlebush) *Encelia resinosa* <pg #>
- 188a (183b) Herbage more or less scabrous and rough to the touch; xeric sites, below 2500 m.....189
- 188b Herbage not scabrous or rough to the touch; moist sites, wet meadows, and stream banks, above 2500 m.....192
- 189a (188a) Leaves 3–6 mm long, sparse, small, inconspicuous; herbage glandular, rough, with short stiff hairs; stems green; plants usually sprawling or pendulous, occasionally erect; hanging gardens, narrow canyons, and cliff bases along the Colorado and San Juan rivers (alcove rock daisy) *Perityle specuicola* <pg #>
- 189b Most mature leaves more than 6 mm long; plants usually erect, not sprawling or pendulous; other characters may vary190
- 190a (189b) Leaves crowded on the stem, 6–15 mm long, oval to obovate, broadly elliptic, thick, firm, the veins not apparent; leaf margins thickened, entire, sometimes slightly revolute; tips rounded; petiole less than 1 mm long; usually on limestone; lower elevations in Washington Co. (mortonia) *Mortonia scabrella* <pg #>
- 190b Not as above in most ways.....191
- 191a (190b) Leaves 1.5–4.5 cm long and 1–3 cm wide, very rough, finely crenate to entire or finely serrate; petioles 1–5 mm long; flowers in white clusters; 780–1220 m; Washington Co. (Parry's sandpaper plant) *Petalonyx parryi* <pg #>

- 191b Leaves 0.5–1.5 cm long and usually less than 1 cm wide; toothed to entire, sometimes lobed; sessile, or nearly so (0–3 mm) (littleleaf brickellbush) ***Brickellia microphylla* <pg #>**
- 192a (188b) Leaf margins crenate, dentate, serrate, or serrulate, some entire toward the base.....**193**
- 192b Leaf margins entire.....**196**
- 193a (192a) Twigs with conspicuous crystalline resin glands; leaves glabrous to minutely hairy, the crenate margins extending almost to the leaf base; moist meadows and streamsides; 2600–3300 m (bog birch)***Betula glandulosa* <pg #>**
- 193b Twigs lacking conspicuous resin glands.....**194**
- 194a (193b) Leaf margins sharply serrulate to serrate, extending to the leaf base or nearly so; leaves usually elliptic, occasionally ovate or obovate; tips usually acute to obtuse (mountain whortleberry)***Vaccinium membranaceum* <pg #>**
- 194b Leaf margins crenate, dentate, or serrate, the lower portion of the leaf usually entire; leaves obovate, oval, ovate, oblanceolate, rhombic, suborbicular, or occasionally elliptic; tips usually rounded, obtuse, or truncate**195**
- 195a (194b) Leaf base usually rounded; leaves oval, ovate, obovate, oblong, or elliptic, often bluish, grayish green, usually less than 3 cm long (Utah serviceberry)***Amelanchier utahensis* <pg #>**
- 195b Leaf base usually cuneate or wedge shaped; leaves obovate to oblanceolate, rhombic or suborbicular, dark green above, pale below; larger leaves up to 5 cm long (alderleaf mountain mahogany)..... ***Cercocarpus montanus* <pg #>**
- 196a (192b) Leaves evergreen, elliptic or oblong, glandular dotted below; margins more or less revolute (Labrador tea).....
..... ***Rhododendron neoglandulosum* <pg #>**
- 196b Leaves deciduous, usually oblanceolate, lacking glands below; margins sometimes slightly revolute (bog whortleberry).....
..... ***Vaccinium uliginosum* <pg #>**
- 197a (182b) Bark reddish brown or maroon, smooth; old bark peels off readily; leaves evergreen, thick, leathery, the margins entire; petioles pubescent.....
.....**198**
- 197b Bark and leaves otherwise (bark sometimes similar in color, but not readily peeling)**200**
- 198a (197a) Herbage glandular hairy, with long spreading hairs; leaves commonly obtuse to acute apically, rounded, obtuse, or cordate at the base; calyx hairy; Beaver Dam Mountains, Washington Co. (Pringle's manzanita) ***Arctostaphylos pringlei* <pg #>**

198b	Herbage puberulent, subtomentose, or finely glandular when young; calyx glabrous, or nearly so.....	199
199a (198b)	Leaves pale green or bluish green, mostly elliptic or lanceolate; leaf apex usually acute, with a sharp point, narrowing at the base; leaves seldom more than 1.5 cm wide; twigs and axis of the inflorescence white puberulent, not glandular; Kane, San Juan, and Washington cos. (point-leaf manzanita)	<i>Arctostaphylos pungens</i> <pg #>
199b	Leaves bright green, broadly ovate to suborbicular; leaf apex usually obtuse or rounded, rounded or truncate at the base, usually 2–3 cm wide; twigs and axis of the inflorescence glandular to glandular puberulent; widely distributed (greenleaf manzanita)	<i>Arctostaphylos patula</i> <pg #>
200a (197b)	Shrubs or subshrubs, usually less than 15 dm tall at maturity	201
200b	Large shrubs or small trees, usually more than 15 dm tall at maturity	208
201a (200a)	Leaves mostly 3-nerved from the base; more or less aromatic.....	202
201b	Leaves 1-nerved from the base	204
202a (201a)	Leaves smooth, shiny green and glabrous above, pale and velvety below, spreading evenly along the branches, the margin with tiny glandular black-tipped teeth; herbage with a strong balsam or cinnamon-like odor; 1890–3355 m; widespread (deerbrush).....	<i>Ceanothus velutinus</i> <pg #>
202b	Plants not as above.....	203
203a (202b)	Twigs of the season leafy toward the base; branches exuding a yellow resin; leaves white tomentose; margins entire to slightly ruffled; base acute to acuminate (brittlebush)	<i>Encelia farinosa</i> <pg #>
203b	Twigs evenly spread along the stem; young stems and the lower surface of the leaf with more or less dense stellate hairs; margins crenate serrate, slightly lobed; base broadly rounded, truncate, or subcordate (California brickellbush).....	<i>Brickellia californica</i> <pg #>
204a (201b)	Leaves more or less rough hairy, light colored; usually below 2100 m	205
204b	Leaves not rough hairy, usually above 2100 m	206
205a (204a)	Petioles less than 3 mm long; longest leaves to 40 mm long, oblong ovate to broadly elliptic, the base cuneate; Chinle and Moenkopi outcrops, Washington Co. (Parry’s sandpaper plant).....	<i>Petalonyx parryi</i> <pg #>
205b	Petioles more than 3 mm long; longest leaves more than 40 mm long, cordate ovate, deltoid, or orbicular, the base broadly rounded (California brickellbush)	<i>Brickellia californica</i> <pg #>

- 206a (204b) Leaves with 5–7 prominent secondary veins on each side; margins crenate, with gland-tipped teeth; aspen-fir community; Davis and Salt Lake cos. (alder buckthorn) *Rhamnus alnifolia* <pg #>
- 206b Secondary veins not particularly prominent; margins entire or serrate; habitat and distribution various **207**
- 207a (206b) Leaves evergreen, somewhat thick, leathery, the margins entire, sometimes somewhat revolute, dark above, pale below, conspicuously gland dotted; stems terete; wet meadows, streamsides, lake margins, and moist forests (Labrador tea).....
..... *Rhododendron neoglandulosum* <pg #>
- 207b Leaves deciduous, thin, membranous, reticulate veined, the margins serrate to serrulate, green on both surfaces, with scattered glands or short hairs below; stems slightly angled; usually in coniferous forests; Cache, Carbon, Duchesne, San Juan, Summit, and Wasatch cos. (mountain whortleberry)..... *Vaccinium membranaceum* <pg #>
- 208a (200b) Leaf margins finely crenate or serrulate, the lower 1/2 sometimes entire **209**
- 208b Leaf margins coarsely serrate or crenate serrate **211**
- 209a (208a) Leaves with 7–12 prominent lateral veins on each side, extending nearly to the margin, the blades broadly elliptic to broadly oblong or obovate, dark green, glabrous above; young stems grayish, the lenticels not conspicuous; usually on sandstone, in rock crevices, narrow shaded canyons, monolith basins, and hanging gardens; Emery, Garfield, Grand, Kane, San Juan, Washington, and Wayne cos. (birchleaf buckthorn) *Rhamnus betulifolia* <pg #>
- 209b Secondary leaf veins not particularly prominent, not extending to the leaf margin; young stems reddish brown, the lenticels conspicuous; habitat and distribution various **210**
- 210a (209b) Most leaves less than 4 cm long, broadly oblanceolate, ovate, or oblong, often in fascicles; margins finely crenate, with glandular hairs in each sinus; leaf apex obtuse to rounded, occasionally acute or retuse; petioles less than 10 mm long; Pine Valley Mountains, Washington Co. (bitter cherry) *Prunus emarginata* <pg #>
- 210b Most leaves more than 4 cm long, ovate to elliptic; margins serrulate, with ascending teeth; leaf apex acuminate to acute; petioles usually more than 10 mm long, with 2 glands near the base of the blade; twigs and branches commonly infected with black-knot fungus; widespread (chokecherry) *Prunus virginiana* <pg #>
- 211a (208b) Leaf tips acute or abruptly acuminate; margins serrate or doubly serrate nearly to the base **212**
- 211b Leaf tips rounded or obtuse; margins serrate or crenate, usually entire toward the base..... **213**

212a (211a)	Bark reddish brown, often shiny, with conspicuous horizontal lenticels; twigs with yellowish to reddish crystalline glands; leaf blades ovate to broadly so; seeds produced in catkins; riparian or near seeps or springs; all Utah counties (western river birch) <i>Betula occidentalis</i> <pg #>
212b	Bark and twigs not as above; blades ovate, lanceolate, or elliptic; seeds produced in a papery cone-like structure; Grand, Kane, and San Juan cos. (western hophornbeam) <i>Ostrya knowltonii</i> <pg #>
213a (211b)	Leaf base usually cuneate; leaves somewhat thick, leathery, dark green above, pale and hairy below, obovate, rhombic, oblanceolate, or orbicular; herbage with ascending appressed hairs (alderleaf mountain mahogany) <i>Cercocarpus montanus</i> <pg #>
213b	Leaf base usually rounded, obtuse, truncate, or subcordate; leaves most broadly obovate to ovate to suborbicular to oblong; herbage glabrous, or variously pubescent 214
214a (213b)	Leaf blades usually 2–6 cm long, green, glabrous to sparsely hairy above, usually glaucous and glabrate below; petioles to 7–18 mm long (serviceberry)..... <i>Amelanchier alnifolia</i> <pg #>
214b	Leaf blades usually 1–3 cm long, usually somewhat hairy on both sides; petioles 2–9 mm long (Utah serviceberry)..... <i>Amelanchier utahensis</i> <pg #>
215a (164b)	Leaves usually restricted to the lower 2/3 of the flowering stem... 216
215b	Leaves usually not restricted to the lower 2/3 of the stem 218
216a (215a)	Flowering stems dichotomously branched; inflorescence cymose; flowers yellow; Entrada Formation and stabilized dunes; Emery and Wayne cos. (Smith's buckwheat)..... <i>Eriogonum smithii</i> <pg #>
216b	Flowering stems not dichotomously branched; flowering heads solitary 217
217a (216b)	Leaf blades linear, usually 1–2.5 mm wide, the margins involute; alkaline gray slopes of the Kaiparowits, Morrison, and Moenkopi formations; endemic to Garfield, Kane, and Wayne cos. (Henrieville woodyaster)..... <i>Xylorhiza confertifolia</i> <pg #>
217b	Leaf blades oblanceolate to oblong spatulate, mostly 2.5–15 mm wide, the margins flat (Cisco woodyaster).. <i>Xylorhiza venusta</i> <pg #>
218a (215b)	Mature plants usually more than 2 m tall; very woody, the trunks often few stemmed or single near ground level 219
218b	Mature plants usually less than 2 m tall; usually with multiple stems 222
219a (218a)	Leaves usually 8–20 cm long; washes, stream courses, terraces, gravel bars, etc.; Washington Co. (desert willow)..... <i>Chilopsis linearis</i> <pg #>
219b	Leaves usually less than 8 cm long; habitat various 220

- 220a (219b) Leaves deciduous, broadly oblanceolate to ovate, the bases cuneate, the margins finely crenate; Pine Valley Mountains, Washington Co. (bitter cherry) *Prunus emarginata* <pg #>
- 220b Leaves evergreen, subterete to elliptical or oblong **221**
- 221a (220b) Leaves subterete to narrowly linear, usually less than 1 mm wide, overlapping; sandstone and limestone outcrops, below 1200 m; Washington Co. (pigmy cedar) *Peucephyllum schottii* <pg #>
- 221b Leaves elliptic to oblong, usually more than 1 mm wide, often revolute; mountain brush and rocky outcrops, above 1200 m; all Utah counties (curl-leaf mountain mahogany)..... *Cercocarpus ledifolius* <pg #>
- 222a (218b) Stems more or less woolly, hairs sometimes dense, thin, or irregularly distributed or, in some cases, mat-like and impregnated with resin, sometimes greenish or yellow (scrape the surface of the stems to determine the presence of matted hairs) **223**
- 222b Stems usually not woolly (occasionally with some hairs, but not considered woolly); not impregnated with resin **233**
- 223a (222a) Glabrescent streaks developing below the base of the primary leaves; primary leaves spinose tipped (littleleaf horsebrush)..... *Tetradymia glabrata* <pg #>
- 223b Stems without glabrescent streaks below the leaf base; primary leaves not spine tipped **224**
- 224a (223b) Stem hairs densely matted and felt-like, impregnated with resin, often green or yellowish and easily overlooked; involucre bracts in 5 more or less vertical ranks, somewhat keeled **225**
- 224b Stem hairs usually white, not impregnated with resin; involucre bracts, if present, not in vertical ranks **226**
- 225a (224a) Plants usually less than 6 dm tall; involucre 10–20 mm long; involucre bracts 8–20, usually subequal (the outer bracts sometimes as long as the inner bracts), weakly aligned vertically, long attenuate; inflorescences tend to be elongated (subracemose); flowers 4–20, yellow to creamy white; achenes pilose (Parry's rabbitbrush)..... *Ericameria parryi* <pg #>
- 225b Plants 2–20 dm tall; involucre 7–14 mm long; involucre bracts 20–25, regularly shortened, obtuse to acute, occasionally attenuate, more or less clearly aligned in vertical rows; inflorescences tend to be cymose; flowers 4–6, yellow to yellow orange; achenes glabrous or hairy (rabbitbrush)..... *Ericameria nauseosa* <pg #>
- 226a (224b) Stems prominently striate, with hairy intervals; leaves less than 1 mm long; along the wash north of the playa; 1705–1740 m; Pine Valley, Millard Co. (Nevada broomshrub) *Lepidospartum latissquamum* <pg #>
- 226b Stems not prominently striate; other characters may vary..... **227**

- 227a (226b) Mature plants usually 8 dm or more tall; 850–1220 m; riparian com-
munity (arrowweed) ***Pluchea sericea* <pg #>**
- 227b Mature plants usually less than 8 dm tall; habitat various **228**
- 228a (227b) Longest leaves usually more than 4 cm long, sometimes thinly
tomentose, usually much greener than the white stems; 800–
1225 m; Kane and Washington cos. (whitestem paperflower)
..... ***Psilostrophe cooperi* <pg #>**
- 228b Longest leaves usually less than 4 cm long; other characters may
vary **92**
- 229a (228b) Plants mat-like; stems conforming to the substrate (rock spi-
raea) ***Petrophytum caespitosum* <pg #>**
- 229b Plants not mat-like, erect or ascending **230**
- 230a (229b) Leaves usually more than 2 mm wide, oblanceolate to oblong; usu-
ally above 2000 m (whitestem goldenbush)
..... ***Ericameria discoidea* <pg #>**
- 230b Leaves usually less than 2 mm wide, linear, semiterete, or filiform;
usually below 2300 m **231**
- 231a (230b) Leaves up to 4 cm long, the smaller leaves appearing fascicled
in the axils; flowers in dense terminal cymose heads; 1155–
2290 m; Garfield, Kane, San Juan, and Washington cos. (ballhead
gilia) ***Ipomopsis congesta* var. *frutescens* <pg #>**
- 231b Leaves up to 25 mm long; flowers solitary or in the leaf axils, spikes
or panicles; widespread **232**
- 232a (231b) Mature plants usually 0.5–3(4.5) dm tall; leaves 1–2 mm wide, linear,
semiterete, fleshy; saline habitats (gray molly)
..... ***Kochia americana* <pg #>**
- 232b Mature plants usually 1–7.5 dm tall; leaves usually less than
1 mm wide, flat, not particularly fleshy (forage kochia)
..... ***Kochia prostrata** <pg #>**
- 233a (222b) Leaves usually 3 mm or less wide at the widest point, filiform, terete,
linear (if difficult to determine, try both ways) **234**
- 233b Leaves usually more than 3 mm wide at the widest point, usually flat,
linear, lanceolate, oblanceolate, or elliptic **261**
- 234a (233a) Leaves basal, cauline; basal leaves sometimes absent, or persistent at
flowering (if the basal leaves are not conspicuous and the plant has
flowered, look for the remains of the leaves at the base of the stems);
ray flowers yellow **235**
- 234b Leaves all cauline; other characters may vary **238**
- 235a (234a) Basal leaves longer than the cauline leaves, crowded, persistent, lin-
ear oblanceolate; cauline leaves gradually reduced upward; Millard
Co. (goldenrod snakeweed) ***Gutierrezia petradoria* <pg #>**

- 235b Basal and lower cauline leaves usually much shorter than the upper cauline leaves, usually fascicled, commonly deciduous before flowering (examine the base of the plant for the remains of dead cauline leaves); distribution various**236**
- 236a (235b) Flowering heads on peduncles; involucre 5–8 mm long; Duchesne and Uinta cos. (orchard snakeweed).....***Gutierrezia pomariensis* <pg #>**
- 236b Flowering heads sessile or subsessile; involucre 2–5(6) mm long**237**
- 237a (236b) Flowers 5–12 per head; flower heads turbinate; branching sometimes restricted to the upper 1/4 of the stem (broom snake-weed).....***Gutierrezia sarothrae* <pg #>**
- 237b Flowers mostly 2–3(4) per head; flower heads cylindric; branching occurs along the upper 1/2 of the stem (small-head snake-weed)..... ***Gutierrezia microcephala* <pg #>**
- 238a (234b) Leaves usually filiform or terete to subterete, or sometimes narrowly linear, flat or sulcate, the largest leaves usually less than 1.2(2) mm wide (if difficult to determine, try both ways).....**239**
- 238b Leaves usually flat, linear, narrowly lanceolate or narrowly oblanceolate (occasionally thick and subterete), the largest leaves usually 1–3 mm wide.....**250**
- 239a (238a) Upper surface of the leaf densely covered with short white stiff hairs; leaves sometimes with a few filiform lobes, aromatic, 2–7 cm long; Washington Co. (burrobush).....***Ambrosia salsola* <pg #>**
- 239b Leaves not as above; other characters may vary**240**
- 240a (239b) Stems prominently striate, with hairy intervals; Millard Co. (Nevada broomshrub)***Lepidospartum latissquamum* <pg #>**
- 240b Stems not as above; distribution various**241**
- 241a (240b) Herbage with conspicuous glands.....**242**
- 241b Herbage without conspicuous glands.....**244**
- 242a (241a) Plants suffrutescent; leaves 1–5 cm long, blue glaucous, sometimes purplish, with conspicuous oil glands, strongly aromatic; involucre 12–15 mm long, with conspicuous elongate oil glands; achenes hispidulous; desert shrub; 1600 m; San Juan and Washington cos. (odora)***Porophyllum gracile* <pg #>**
- 241b Woody shrubs; leaves usually less than 3 cm long; herbage copiously glandular punctate, resinous; branchlets yellowish brown; involucre less than 12 mm long; achenes hairy; Washington Co. ...**243**

- 243a (242b) Plants 3–8 dm tall; leaves thick, linear to subterete, 7–20 mm long and 1–1.5 mm wide, the midnerve not evident; heads in small clusters; involucre 3–6 mm long; dry streambeds, banks of washes, seepage areas, and open rocky slopes; 1030–2410 m (larchleaf goldenbush)*Ericameria laricifolia* <pg #>
- 243b Plants 4–10 dm tall; leaves linear to narrowly oblanceolate, 6–30 mm long and 1–2.5 mm wide, the midnerve evident; heads solitary, on 2–5 cm peduncles; involucre 8–10 mm long; dry, open, often rocky areas; 700–1400 m (narrowleaf goldenbush)*Ericameria linearifolia* <pg #>
- 244a (241b) Longest leaves less than 15 mm long (if difficult to determine, try both ways).....245
- 244b Longest leaves usually more than 15 mm long246
- 245a (244a) Plants 1–7.5 dm tall, subshrub, deciduous, introduced; usually above 1100 m (forage kochia) *Kochia prostrata** <pg #>
- 245b Plants 10–20 dm tall, woody, evergreen, with a single stem; rocky slopes, cliff faces, and talus slopes; 1000–1100 m; Beaver Dam Mountains, Washington Co. (pigmy cedar)*Peucephyllum schottii* <pg #>
- 246a (244b) Plants less than 5 dm tall; new stems green, soon becoming white or tan247
- 246b Plants more than 5 dm tall; stem color various248
- 247a (246a) Upper surface of the leaves usually glabrous; leaves linear filiform, occasionally twisted; leaf margins glabrous or hirtellous; involucre bracts acuminate cuspidate; sandy washes and dry open habitats (Greene’s rabbitbrush) *Chrysothamnus Greenei* <pg #>
- 247b Upper surface of the leaves usually hairy; leaves filiform terete; leaf margins ciliate; involucre bracts acute, obtuse, or rounded; granitic sandy soils (Inyo rabbitbrush)*Chrysothamnus viscidiflorus* var. *axillaris* <pg #>
- 248a (246b) Stems usually white, glabrous, brittle; leaves inconspicuously glandular punctate, aromatic, often fascicled; corolla white; saline environments, above 1400 m; Beaver, Box Elder, Juab, and Millard cos. (whiteflower rabbitbrush)*Ericameria albida* <pg #>
- 248b Stems green or brown, pubescent, not brittle; leaves prominently glandular punctate, aromatic, not fascicled; corolla yellow; below 1400 m; Washington Co.249
- 249a (248b) Shrubs with a single stem at the base, 10–35 dm tall; leaves evergreen, overlapping, aromatic; talus slopes, cliffs, and rocky outcrops; 1000–1100 m; Beaver Dam Mountains, Washington Co. (pigmy cedar).....*Peucephyllum schottii* <pg #>

- p>249b Shrubs with multiple stems at the base, 6–20 dm tall; stems and leaves resinous punctate; leaves aromatic, deciduous; washes, terraces, slopes, and roadsides (Mojave rabbitbrush).....
- Ericameria paniculata* <pg #>**
- p>250a (238b) Stems white tomentose; leaves thinly tomentose, 1–7 cm long; flowers yellow; 800–1225 m; Kane and Washington cos. (whitestem paperflower)
- Psilostrophe cooperi* <pg #>**
- p>250b Stems not white tomentose; other characters may vary
- 251**
- p>251a (250b) Leaves not glandular
- 252**
- p>251b Leaves glandular, sometimes inconspicuously so.....
- 255**
- p>252a (251a) Leaves firm, leathery, evergreen, usually less than 1 cm long, oblong to linear; margins revolute, with a white hairy underside (dwarf mountain mahogany)
- Cercocarpus intricatus* <pg #>**
- p>252b Leaves not particularly firm, not leathery, up to 3.5 cm long.....
- 253**
- p>253a (252b) Subshrubs, usually somewhat woody at the base, with green to dark red herbaceous stems; leaves sparse, glaucous, subterete to flattened, sometimes fleshy; plants of saline environments; 1100–1955 m (bush seepweed).....
- Suaeda nigra* <pg #>**
- p>253b Shrubs erect, definitely woody throughout; other characters may vary.....
- 254**
- p>254a (253b) Leaf margins scabro-ciliate; leaves linear to linear oblong, the midvein evident and often purplish; involucre 4–6mm wide; disk flowers 4–5; Emery, San Juan, and Wayne cos. (Bailey’s rabbitbrush).....
- Lorandersonia baileyi* <pg #>**
- p>254b Leaf margins glabrous or hirtellous, not scabrous ciliate; leaves narrowly linear, narrowly obovate, or spatulate; involucre 7–15 mm wide; disk flowers 12–45; Kane, San Juan, and Washington cos. (rayless goldenhead)
- Acamptopappus sphaerocephalus* <pg #>**
- p>255a (251b) Leaves usually punctate or gland dotted
- 256**
- p>255b Leaves sometimes glandular or resinous or stipitate glandular, but usually not punctate.....
- 258**
- p>256a (255a) Mature plants usually less than 3 dm tall; not fastigiate or with fascicled leaves (Vasey’s rabbitbrush).....
- Chrysothamnus vaseyi* <pg #>**
- p>256b Mature plants usually more than 3 dm tall, fastigiate, sometimes with fascicled axillary leaves; Washington Co.
- 257**
- p>257a (256b) Leaves with evident midnerves; flowering heads borne singly, on peduncles 5–7 cm long (narrowleaf goldenbush)
- Ericameria linearifolia* <pg #>**
- p>257b Midnerves of leaves not evident; inflorescence cymose, with short peduncles (larchleaf goldenbush)
- Ericameria laricifolia* <pg #>**

258a (255b)	Leaves more or less twisted, 1–3-nerved, sometimes fascicled, the leaf surface, or just the margins, sometimes scabro-ciliate (viscid rabbitbrush).....	<i>Chrysothamnus viscidiflorus</i> <pg #>
258b	Leaves not twisted; other characters may vary	259
259a (258b)	Leaves somewhat crowded on the lower 1/2 of the stems, linear, somewhat involute; flowering heads on long peduncles; flowers white; plants suffrutescent, 1–1.5(2) dm tall; barren alkaline clay slopes; somewhat rare; 1400–2300 m; Kane and Garfield cos. (Henrieville woodyaster)	<i>Xylorhiza confertifolia</i> <pg #>
259b	Leaves extending to near the top of the stems, narrowly oblanceolate to linear or elliptic, not involute; inflorescence cymose; flower yellow; plants low rigidly branched shrubs, 1–3(5) dm tall; distribution various	260
260a (259b)	Young stems densely puberulent, ridged from the leaf bases, green, soon becoming whitish; leaves ascending to erect, 7–30 mm long, usually hirtellous to glandular scabrous, occasionally stipitate glandular; involucre in 5 strong vertical ranks, often purple tinged; achene glabrous to stipitate glandular (dwarf rabbitbrush).....	<i>Chrysothamnus depressus</i> <pg #>
260b	Young stems glabrous to glandular or resinous, not ridged from the leaf base; leaves appearing varnished, 10–15(25) mm long, sometimes sulcate on the upper surface, erect to spreading, often with axillary fascicles; involucre not strongly aligned; mostly western Utah (dwarf goldenbush).....	<i>Ericameria nana</i> <pg #>
261a (233b)	Mature plants usually more than 6 dm tall	262
261b	Mature plants usually less than 6 dm tall	270
262a (261a)	Leaves evergreen, more or less leathery, glandular punctate; margins more or less revolute; plants usually above 2600 m (Labrador tea).....	<i>Rhododendron neoglandulosum</i> <pg #>
262b	Leaves usually not leathery; margins usually not revolute; plants usually below 2600 m	263
263a (262b)	Leaves usually fascicled to some degree, usually less than 4 cm long, narrowly elliptic to narrowly lanceolate; plants intricately branched.	264
263b	Leaves usually not fascicled; other characters may vary	265
264a (263a)	Longest leaves usually less than 2.5 cm long, sessile (or nearly so), entire or few toothed, or sometimes weakly lobed near the tip; branchlets pubescent, ashy or grayish, sometimes somewhat thorny; fruit a drupe; 625–2000 m (desert almond)	<i>Prunus fasciculata</i> <pg #>

- 264b Longest leaves usually more than 2.5 cm long, petioles 1.5–4.5 mm long, entire to serrulate; young bark reddish, becoming gray, appressed pubescent; fruit a pome; 1500–2000 m (squaw apple).....*Peraphyllum ramosissimum* <pg #>
- 265a (263b) Longest leaves usually more than 8 cm long (1.2–13.5 cm long and 3–8 mm wide), glandular resinous, 1–3-nerved (longleaf brickell-bush).....*Brickellia longifolia* <pg #>
- 265b Longest leaves usually up to 8 cm long; other characters may vary.....**266**
- 266a (265b) Stems of the season freely branching well below the inflorescence.....**267**
- 266b Stems of the season long, slender, simple, or nearly so, below the inflorescence.....**269**
- 267a (266a) Large shrubs, 8–20(35) dm tall, spreading by shoots coming from the rhizomes; bark white and glabrous; leaves firm, flat, 1–3-nerved; involuclral bracts in 5 vertical ranks; alkaline and saline substrates; Colorado River drainage (spearleaf rabbitbrush)*Lorandersonia linifolia* <pg #>
- 267b Shrubs and subshrubs, usually less than 10 dm tall, not spreading from the rhizomes; herbage often resinous, glutinous, or viscid; involuclral bracts imbricate, or in weak vertical ranks.....**268**
- 268a (267b) Leaves often reflexed, falcate, and folded; tips spinulose; flowering head with 30–40 florets; dunes and sandy soils; 1100–1700 m (resin-bush).....*Chrysothamnus stylosus* <pg #>
- 268b Leaves not as above, often twisted, sometimes ciliate; tips not spinulose; florets fewer than 15 per head; often with *Artemisia*, not tolerant of alkali substrates (viscid rabbitbrush)... *Chrysothamnus viscidiflorus* <pg #>
- 269a (266b) Leaves 1-nerved, sometimes inconspicuously gland dotted or glutinous; tips obtuse to acute; branchlets greenish to straw colored; alkaline drainages and wash bottoms, and the margins of saline streams; below 1800 m (Rusby's goldenbush)*Isocoma rusbyi* <pg #>
- 269b Leaves 3–5-nerved, glabrous; tips attenuate to spinulose; leaves and stems scaberrulose or minutely hirtellous; branches ashy gray to white; well-drained mountain slopes on sandstone substrates; 1200–2200 m (mountain goldenbush) *Chrysothamnus scopulorum* <pg #>
- 270a (261b) Some leaves usually shallowly spinulose toothed, sometimes entire; midrib prominent; stems whitish, sometimes hairy at the nodes; gray sands of Kaiparowits Formation; Kane Co. (Cronquist's woodyaster)*Xylorhiza cronquistii* <pg #>
- 270b Leaves usually entire, occasionally toothed; other characters may vary.....**271**

- 271a (270b) Leaves basal, cauline, 3–5-nerved from the base (rock golden-rod) ***Petradoria pumila* <pg #>**
- 271b Leaves all cauline, sometimes 3–5-nerved **272**
- 272a (271b) Herbage not appearing glandular **273**
- 272b Herbage, at least the new leaves, more or less glandular, resinous glutinous, stipitate glandular, or glandular punctuate **279**
- 273a (272a) Mature plants up to 3(4) dm tall **274**
- 273b Mature plants usually more than 3 dm tall **276**
- 274a (273a) Leaves somewhat revolute, the lower leaves often opposite; inflorescence cymose; flowers yellow; fruit a membranous circumscissile capsule; 1500–2000 m; Beaver, Garfield, Kane, and Washington cos. (rough menodora) ***Menodora scabra* <pg #>**
- 274b Leaves not revolute, the lower leaves alternate; flower heads borne singly, on terminal peduncles; flowers white to bluish or purple; fruit an achene **275**
- 275a (274b) Leaves with attenuate bases; flowers off-white to white; Mancos shale; Daggett Co. (smooth woodyaster) ***Xylorhiza glabriuscula* <pg #>**
- 275b Leaves with truncate or rounded bases; flowers bluish, purple, or white; Chinle, Shinarump, and Moenkopi formations in eastern Garfield, Grand, San Juan, and Wayne cos. (Moab woodyaster) ***Xylorhiza linearifolia* <pg #>**
- 276a (273b) Longest leaves usually 4 cm or less long **277**
- 276b Longest leaves often more than 4 cm long; stems long, slender, and simple below the inflorescence **278**
- 277a (276a) Leaves 1–5 mm wide; leaves and twigs glabrous; involucre 4–7 mm wide; flowers yellow; Kane, San Juan, and Washington cos.; 850–1560 m (rayless goldenhead) ***Acamptopappus sphaerocephalus* <pg #>**
- 277b Leaves 1–11 mm wide; leaves puberulent to villous, or sometimes stipitate glandular, obscurely 3-nerved from the base; involucre bracts 3–5, with conspicuous green longitudinal stripes; flowers off-white; 1200–2800 m (Mojave brickellbush) ***Brickellia oblongifolia* <pg #>**
- 278a (276b) Stems longitudinally striate; leaf blades 1-nerved; usually in a saline desert shrub community; Emery, Grand, Kane, and San Juan cos.; 800–1800 m (Rusby's goldenbush) ***Isocoma rusbyi* <pg #>**
- 278b Stems not longitudinally striate; leaf blades usually 3–5-nerved from the base; usually on sandstone substrate; Garfield, Iron, Kane, San Juan, and Washington cos.; 1370–1950 m (mountain goldenweed) ***Chrysothamnus scopulorum* <pg #>**

- 279a (272b) Leaves sparse or absent much of the year; stems conspicuously glandular punctate, strongly aromatic; leaves soon deciduous, the plants appearing leafless much of the year; plants often less than 6 dm tall; flowers dark purple black; fruit 2 lobed; 760–1650 m; Washington Co. (desert-rue) *Thamnosma montana* <pg #>
- 279b Leaves numerous; stems and/or leaves usually stipitate glandular, glandular punctate, or resinous to some degree, not always conspicuous; other characters various **280**
- 280a (279b) Stems glabrous, resinous, glutinous, or hirtellous puberulent, rarely stipitate glandular; leaves glabrous to hirtellous puberulent, 1–8 mm wide, often twisted or plane; heads discoid; corollas yellow; achenes hairy **281**
- 280b Stems and/or leaves usually stipitate glandular, sometimes resinous; other characters may vary **283**
- 281a (280a) Young stems ridged from the leaf bases, green; older bark becoming gray, flaky; leaves ascending or erect, usually hirtellous to glandular scabrous; plants usually less than 3(5) dm tall; involucre with (4)5 strong vertical ranks, often purple tinged; flowers yellow; achenes glabrous to sparsely stipitate glandular (dwarf rabbit-brush) *Chrysothamnus depressus* <pg #>
- 281b Young stems not ridged from the leaf base; other characters may vary **282**
- 282a (281b) Subshrub, with herbaceous stems arising from a woody base; stems longitudinally striate; herbage usually glabrous, resinous, usually not hirtellous or puberulent; leaves 1-nerved, entire, or sometimes with 1 to several irregular teeth; secondary veins not conspicuous; involucral bracts with a green or brownish subapical spot; often in saline or alkaline environments; 1050–1800 m; Emery, Garfield, Grand, Kane, and San Juan cos. (Rusby's goldenbush) *Isocoma rusbyi* <pg #>
- 282b Woody shrubs; stems not particularly striate; herbage hirtellous to puberulent, sometimes glabrous; leaves 1–5-nerved, often twisted; involucre sometimes thickened near the apex (viscid rabbit-brush) *Chrysothamnus viscidiflorus* <pg #>
- 283a (280b) Leaves usually flat, not crisped or undulate; mature leaves usually more than 3 cm long **284**
- 283b Leaves usually crisped or undulate; mature leaves usually less than 3 cm long **286**
- 284a (283a) Base of leaf rounded, truncate, or auriculate; leaf blade linear oblong to linear lanceolate, up to 7 cm long and 5 mm wide; plants simple or few branched; ray flowers present, pale blue to white; Garfield, Grand, San Juan, and Wayne cos.; 1300–2000 m (Moab woodyaster) *Xylorhiza linearifolia* <pg #>

284b	Base of leaf acute to attenuate; leaf blade up to 4 cm long and often more than 5 mm wide; ray flowers lacking 285
285a (284b)	Subshrub, to 6 dm tall; stems erect; leaves oblong to linear lanceolate or elliptical, sometimes oblanceolate, up to 15 mm wide; upper leaves not surpassing the inflorescence; peduncle up to 5 cm long; involucral bracts conspicuously striate; flowers off-white, with a purple tinge; rocky slopes, deserts, and grasslands; 1200–2800 m (Mojave brickellbush) <i>Brickellia oblongifolia</i> <pg #>
285b	Shrubs, to 3 dm tall; stems decumbent to ascending; leaves usually spatulate to oblong elliptic, up to 7 mm wide; upper leaves often longer than the inflorescence; peduncle less than 1.5 cm long; involucral bracts not striate; limestone member of Cedar Breaks Formation (Claron limestone); Garfield, Iron, and Kane cos.; 2400–3100 m (Cedar Breaks goldenbush) <i>Ericameria zionis</i> <pg #>
286a (283b)	Leaves with short stipitate or sessile glands, resinous 287
286b	Leaves with densely long stipitate glands 288
287a (286a)	Leaves oblong to oblanceolate, up to 3 cm long; tips acute to acuminate; margins more or less crisped; ray flowers absent; Millard and Washington cos.; 2400–3100 m (crisped goldenbush) <i>Ericameria crispa</i> <pg #>
287b	Leaves elliptical to obovate, up to 1.8 cm long; tips usually rounded, sometimes obtuse or acute; margins undulate; ray flowers present; in rock crevices and on talus; Beaver, Iron, and Millard cos.; 1600–2700 m (deer goldenbush) <i>Ericameria cervina</i> <pg #>
288a (286b)	Leaves obovate to spatulate, up to 12 mm wide; disk flowers 5–15; on open rocky soils in xeric sagebrush, pinyon-juniper, and ponderosa pine communities; Cache, Millard, Rich, Salt Lake, and Tooele cos.; 1500–3400 m (Rydberg’s goldenbush) <i>Ericameria obovata</i> <pg #>
288b	Leaves elliptic to oblanceolate, up to 8 mm wide; disk flowers 15–25; rock outcrops in xeric sagebrush, pinyon-juniper, and ponderosa pine communities; Beaver and Millard cos.; 1300–3400 m (Watson’s goldenbush) <i>Ericameria watsonii</i> <pg #>

Gymnosperm Descriptions

The term “gymnosperm” is derived from two Greek words, *gymnos*, meaning “naked,” and *sperma*, meaning “seed.” It commonly refers to vascular plants with naked seeds. These plants have no flowers, the seeds are not enclosed in a fruit, and the pollen is airborne. Gymnosperms include four major divisions: Ginkgophyta (ginkgo), Cycadophyta (cycads), Gnetophyta (*Gnetum* and ephedra), and Pinophyta (conifers). Many species in the division Pinophyta are important economically. Extant gymnosperms represent only a fraction of the diversity of members of this group that once lived on earth. Gymnosperms native to Utah are represented by three families: Cupressaceae, Ephedraceae, and Pinaceae.

CUPRESSACEAE—Cypress family

The cypress family consists of aromatic trees and shrubs that are mostly evergreen. The leaves are scale-like or awl-like to somewhat linear. The seed cones may have scales that are berry-like, with fused fleshy scales (as in *Juniperus*), or with the distinct woody or papery scales found in other genera in the family. This family includes cypress (*Cupressus*), incense cedar (*Calocedrus*), junipers (*Juniperus*), coast redwood (*Sequoia*), giant sequoia (*Sequoiadendron*), and bald cypress (*Taxodium*). Many of these are resistant to disease, and the wood is very durable, even when in contact with the soil. Junipers, commonly misnamed “cedars,” are members of the genus *Juniperus*. True cedars, in the genus *Cedrus*, are not native to the United States but occur here as ornamentals in managed landscapes.

Juniperus L.

Juniperus is Latin for “juniper.” The young stems are covered with overlapping scale-like or awl-like leaves. The female cones are berry-like.

Juniperus communis L., Common juniper



Description: Common juniper may grow to 6 m tall but usually spreads as an understory species less than 1 m tall, with one to several spreading or ascending stems. The leaves are simple, awl-like, less than 15 mm long, and commonly borne in clusters of 3 per node. Each leaf is dark green, with a white band running along the upper surface. The cones mature after 2 years as firm, fleshy, berry-like structures that are bluish black and glaucous.

Habitat and range: *Juniperus communis* grows with aspen-mixed conifer forests throughout Utah. It is circumboreal in the Northern Hemisphere and runs from the Yukon drainage of Alaska eastward to the Atlantic coast and southward to Alabama, California, and Nebraska.

Comments: The variety native to Utah is *Juniperus communis* var. *depressa* (Steven) Boiss. It is an important browse for wildlife and provides excellent cover. The berries are a significant food source for wild turkeys and other birds. Like other species in the genus *Juniperus*, the berries may be used for flavoring gin. Common juniper does not recover well from fire. *Communis* means “common.”

Juniperus osteosperma (Torr.) Little, Utah juniper

Description: Utah junipers are small, long-lived evergreen trees up to 4 m tall. They usually have a single stem at ground level, which soon branches into many stems of similar size. The mature tree is almost as wide as tall, resulting in a somewhat rounded crown. The bark is strongly fibrous, shredding into long strips. The foliage consists of first-year, awl-shaped

needles less than 8 mm long, and long-lived leaves that are dark green, scale-like, and closely imbricate on younger branches. The male cones, produced on the lower branches, are yellowish brown in color and less than 4 mm long. The larger female cones form on the upper branches and, when mature, are berry-like, subglobose structures less than 12 mm thick, blue or brownish in color, bearing 1 or 2 seeds.



Habitat and range: *Juniperus osteosperma* grows in xeric sagebrush, mountain brush, pinyon-juniper, ponderosa pine, and aspen-mixed conifer communities. It is one of the dominant species in the pinyon-juniper complex. The species occurs in most Utah counties. It is also found in Arizona, California, Colorado, Montana, Nevada, New Mexico, and Wyoming.

Comments: This species suppresses the growth of understory plants. The wood is used for firewood and fence posts, and other parts of the plant have been used for food, beads, mats, and cordage. It is also a host for the juniper mistletoe (*Phoradendron juniperinum*). *Osteo* means "bone" and *sperma* means "seed."

***Juniperus scopulorum* Sarg., Rocky Mountain juniper**

Description: Rocky Mountain juniper is usually a single-stemmed, spire-shaped tree with numerous smaller side branches. The branchlets are less than 1 mm thick. The juvenile leaves are less than 8 mm long, awl shaped, and sharp tipped. Older leaves are usually opposite, less than 3 mm long, bluish green or dark green in color, and strongly imbricate on younger branches. Mature leaves sometimes have an obvious resin gland on the upper side. The male cones are less than 3 mm long and brownish. The female cones are less than 6 mm thick, subglobose, bluish, and glaucous at maturity. Ovulate cones mature after 2 years and appear as firm-fleshed, 2-seeded berries.

Habitat and range: *Juniperus scopulorum* grows in pinyon-juniper, mountain brush, ponderosa pine, Douglas fir, and aspen-mixed conifer

communities in all Utah counties. It also is found from British Columbia to the Dakotas and southward to Texas, New Mexico, Arizona, and Nevada.



Comments: The oldest known tree in Utah, the “Jardine juniper” in Logan Canyon, is estimated to be 3600 years old. This species is sometimes called weeping juniper because of its drooping branchlets, which help distinguish it from *Juniperus osteosperma*. Although the wood is beautiful and fragrant, the branches generally do not grow large enough to be an important lumber source. *Scopulorum* refers to cliffs or rocky areas.



EPHEDRACEAE—Ephedra family

This gymnosperm family consists of plants in the genus *Ephedra*. They are much-branched shrubs, having green jointed stems with fine longitudinal grooves, and appear nearly leafless. The leaves are small bracts that occur in twos or threes at the nodes. The roots are fibrous. This family occupies arid regions around the world, except for Australia. Plants in this family are used for medicinal purposes, due to alkaloids and tannins present in the stems.

Ephedra L.

Ephedra is Latin for “horsetail” (not to be confused with the genus “*Equisetin*” commonly known as “horsetail.” The stems are green and striate. The leaves are opposite or in whorls and usually reduced to bracts.

Ephedra fasciculata A. Nelson, Mojave ephedra



Description: Mojave ephedra is a prostrate shrub less than 1 m tall. The branches are somewhat angled, flexible, round, and pale green when new, becoming rough and yellowish over time. The leaves are opposite, less than 3 mm long, and bear a transparent sheath at their base. The male cones are obovate, up to 8 mm long, and sessile, with obovate pale yellow bracts less than 3 mm long. The female cones are sessile, up to 13 mm long, with whorls of elliptical bracts up to 7 mm long. The bracts are pale brown, with hyaline edges. The seeds are usually single, elliptical, pale brown, up to 12 mm long, and longitudinally furrowed.

Habitat and range: *Ephedra fasciculata* grows along seasonally active washes and on rocky slopes in Mojave Desert communities in Washington Co. It is also found in Arizona, California, and Nevada.

Comments: *Fasciculata* means “fascicled” or “clustered,” referring to the branches.

Ephedra nevadensis S. Watson, Nevada ephedra



Description: Nevada ephedra grows to 1.5 m tall, with branches that are pale green, glaucous, and rather smooth. The stems become grayish with age, especially on the lower segments. The leaves occur in pairs and are less than 5 mm long, with thickened midribs. The male cones are ellipsoid, sessile, or pedunculate, light brown or greenish yellow, up to 8 mm long, and have up to 9 pairs of obovate membranous bracts up to 5 mm long. The female cones are roundish, up to 11 mm long. The seeds are ellipsoid, brown, smooth, up to 9 mm long, and usually in pairs.

Habitat and range: *Ephedra nevadensis* grows in Mojave Desert, xeric sagebrush, and pinyon-juniper communities throughout Utah. It grows well in arid, well-drained, sandy or rocky soils. This species is also known from Arizona, California, Nevada, and Oregon.

Comments: Nevada ephedra is a moderately palatable and nutritious forage plant for both native and domestic herbivores in winter and early spring. It readily sprouts following fire. *Nevadensis* means “of Nevada.”

Ephedra torreyana S. Watson, *Torrey's ephedra*



Description: Torrey's ephedra grows up to 1 m tall. The stems are round, less than 3.5 mm thick, olive or blue green, and appear smooth, but are longitudinally furrowed under magnification. The leaves are 3 per node and fused at their base for nearly 2/3 of their length. The male cones are borne singly or several in a whorl at the nodes. The female cones are sessile, ovoid, less than 13 mm long, and appear singly or several at a node. The bracts are obovate, clawed, and less than 10 mm long. The seeds are yellow green to pale brown, less than 10 mm long, and occur singly or in pairs.

Habitat and range: Torrey's ephedra occurs in Mojave Desert, salt desert shrub, mountain brush, and pinyon-juniper communities in eastern, central, and all southern Utah counties. It has also been collected in Arizona, Colorado, Nevada, and Texas.

Comments: Like other species in this genus, herbal teas have been prepared from the stems of *Ephedra torreyana*. It provides moderate forage for wildlife. *Torreyi* honors John Torrey, a 19th-century American botanist and teacher of Asa Gray.

***Ephedra viridis* Coville**

In Utah, two varieties are recognized and may form a continuum where their ranges overlap.

***Ephedra viridis* var. *viridis* Coville, Green ephedra**

Description: Green ephedra is a dioecious shrub growing up to 1.5 m tall. The stems are spreading or stiffly erect, dark green or sometimes yellowish green, and not viscid. The 2 small leaves at each node are opposite and thickened along their midvein. The leaf tips are deciduous. The male cones are obovoid, sessile, and up to 7 mm long, with bracts that are up to 4 mm long and pale yellow. The female cones are obovoid, up to 10 mm long, and sessile or pedunculate, with up to 8 pairs of ovate bracts. The seeds are brown, smooth, triangular, up to 8 mm long, and borne in pairs.



Habitat and range: This variety grows in Mojave Desert, salt desert shrub, mountain brush, and pinyon-juniper communities throughout Utah. It also occurs in Arizona, California, Colorado, Nevada, Oregon, and Wyoming.

Comments: Like other species in this genus, green ephedra has been used as a medicinal or herbal tea, and it is sometimes referred to as “Mormon tea” or “Brigham tea.” *Viridis* means “green.”

Ephedra viridis var. *viscida* (Cutler) L. D. Benson, Cutler's ephedra



Description: Cutler's ephedra grows up to 1.5 m tall. It usually grows horizontally and may be rhizomatous, forming clumps. It may develop a very blue-green appearance. Characteristics of this variety may be much like the preceding taxon, except that the female cones are always pedunculate, with peduncles up to 17 mm long, and the stems are usually viscid.

Habitat and range: Cutler's ephedra is usually found in areas of moving sand dunes in eastern and southern Utah, as well as in Arizona, Colorado, and New Mexico.

Comments: This variety is often treated at the species level as *Ephedra cutleri* Peebles. *Viscida* means "sticky."



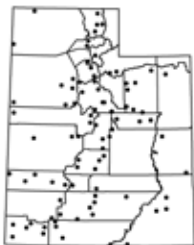
PINACEAE—Pine family

The pine family consists mainly of monoecious evergreen trees occurring primarily in the Northern Hemisphere. The leaves are usually modified as needles that occur singly or in bunches and are resinous and aromatic. The male cones are usually small and produce copious amounts of pollen, while the female cones are large and usually mature on the tree for several seasons before the seeds are ready for dispersal. Some cones remain closed on the tree for several years and open only following fire or several years of drought. This condition is known as “serotiny” and is common in lodgepole and other pine species. The pine family provides major economic resources for humans, such as lumber, essential oils, resins, paper, and food. It also is an important food source, and provides habitat and cover, for many wildlife species. There are 4 genera and 11 species native to Utah.

Abies Mill.

Abies is Latin for “fir” or “silver fir.” The needles are single on the stem, flat in cross section, and somewhat flexible. The buds are light colored and blunt. The female cones are erect, with deciduous scales.

Abies concolor (Gordon & Glend.) Lindl. ex Hildebr., White fir



Description: White fir is a handsome tree growing to well over 40 m on good sites. The crown is usually conic but, on open windy sites, it may be rounded. The bark is light colored, smooth, and glabrous on young stems, becoming dark brown and deeply furrowed on older stems. The needles occur separately, and are light bluish, flat, with blunt tips, up to 5.5 cm long, and have a tendency to point upward. The male cones are rose to dark red or sometimes yellow and up to 15 mm long. The female cones are erect on the uppermost branches, yellowish green to deep purple, oblong, cylindric, and up to 12 cm long. The cones disintegrate at

maturity, dropping the fan-shaped scales and releasing the broad-winged seeds, which are up to 12 mm long.

Habitat and range: *Abies concolor* grows in mountain brush, aspen-mixed conifer, and Douglas fir communities in almost all Utah counties. It is also known from Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, and Oregon.

Comments: White fir is of moderate importance as a source of lumber. It has landscape potential but does not tolerate wind or high soil pH. It is an important food source for birds and some mammals. *Concolor* means “of the same color.”

***Abies lasiocarpa* (Hook.) Nutt., Subalpine fir**



Description: Subalpine fir may grow up to 40 m tall. On good sites the trees are narrowly spire shaped, but at treeline they are often sprawling and shrub-like. The bark on young stems is smooth, pubescent, and bluish green, becoming dark gray and furrowed with age. The needles are blue green, flat, with blunt tips, up to 3 cm long and 2 mm wide, and distinctively point upward. The male cones form on the lower branches and are bluish, up to 9 mm long. The female cones are usually dark purple, up to 10 cm long, and borne erect on the uppermost branches. At maturity the cones disintegrate on the tree to release the winged seeds, which are up to 1 cm long.

Habitat and range: Subalpine fir grows in aspen-mixed conifer and spruce-fir forests, and it is often associated with Engelmann's spruce. It grows throughout Utah. It is also found in Alaska, Arizona, Colorado, New Mexico, Oregon, and Canada.

Comments: The seeds, buds, and needles of *Abies lasiocarpa* are a good source of food for grouse and squirrels. *Lasiocarpa* means “rough or woolly fruit.”



***Picea* A. Dietrich**

Picea means “pitchy.” The needles are single on the stem, mostly quadrangular in cross section, and sharp pointed, with peg-like leaf bases that remain on the twig.

Picea engelmannii Parry ex Engelm., Engelmann spruce

Description: Engelmann's spruce grows up to 40 m tall on good sites. At higher elevations near timberline, the plants are reduced to shrubby thickets and ragged flagged stems. The twigs are pubescent and bluish green. The bark becomes reddish brown and scaly with age. The needles are borne singly and are 4 angled, glaucous or bluish green, acutely tipped, and up to 25 mm long. The male cones are yellow brown, up to 15 mm long, and borne on the lower branches. The female cones form mostly on the upper branches and are cylindric, pendant, up to 5.5 cm long, and persistent. The seeds are winged.

Habitat and range: *Picea engelmannii* grows in aspen-mixed conifer, Douglas fir, and spruce-fir communities throughout Utah. It also grows in British Columbia, Alberta, and southward into Mexico.

Comments: Engelmann's spruce are harvested for lumber and are most commonly used for telephone poles. These trees have also been used for canoes, piano boards, and violins. *Engelmannii* is named after George Engelmann, a 19th-century German-born botanist influential in describing the flora of the American West.

Picea pungens Engelm., Blue spruce

Description: Blue spruce grows to over 40 m tall on better sites and forms dense crowns that vary from broadly conical to pyramidal. The bark is light colored and smooth on the youngest stems, becoming dark gray or brownish and furrowed with age. The twigs are glabrous, shiny, and produce needles that are 4 angled, up to 30 mm long, and tapered to a sharply pointed tip. The peg-like base of the needles persists after the needles are shed, leaving rough twigs. The male cones form on the lower branches and are yellow, up to 15 mm long. The female cones form on the upper branches and are purplish when young, becoming light brown with age. Mature cones are up to 12 cm long and produce seeds that are up to 3 mm long and winged.



Habitat and range: *Picea pungens* occurs in aspen-mixed conifer, Douglas fir, and riparian communities throughout Utah. It usually grows at lower elevations than does *P. engelmannii*. It is also reported from Arizona, Colorado, Idaho, New Mexico, and Wyoming.

Comments: Blue spruce is the state tree for Utah and Colorado. Its cultivated and blue forms are popular ornamentals. Early settlers of the state who used it for lumber referred to it as “white pine.” It may form hybrids with *Picea engelmannii*. *Pungens* means “sharp.”

***Pinus* L.**

Pinus is Latin for “pine.”

The needles are usually in bundles of 1–5, surrounded by a papery sheath at the base. The bundle is round in cross section. The female cones are woody.

***Pinus contorta* Douglas ex Loudon, Lodgepole pine**

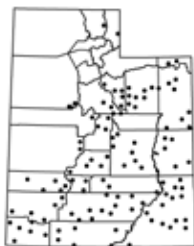


Description: Lodgepole pine grows up to 35 m tall on good sites. The trees grow in dense, often even-aged stands following wildfires. Two somewhat twisted needles per fascicle are produced on the slender orange to red-brown twigs. The female cones are serotinous and up to 6 cm long.

Habitat and range: Lodgepole pine grows in aspen-conifer, stream-edge, and spruce-fir communities. In Utah, it occurs in the northern counties overlapping the Uinta and Wasatch ranges. It is also known from Alaska and Saskatchewan, southward to Colorado and California.

Comments: *Pinus contorta* exhibits a strong main stem that rarely forms large side branches and, as a result, produces long tapered stems that are particularly suitable for lumber. They are used for railroad ties, poles, and fence posts. The serotinous cones may not dehisce for many years. The cones are highly resistant to fire, but open after the fire has passed and release an abundance of viable seed. Lodgepole pine is fairly drought resistant and shade intolerant. *Contorta* refers to the twisted needles.

***Pinus edulis* Engelm., Two-needle pinyon pine**



Description: Two-needle pinyon pine often grows up to 15 m tall, with a central stem that is not strongly dominant; thus there are numerous lateral, steeply ascending stems slightly smaller than the main stem. The trees are therefore broadly pyramidal in shape. The needles occur in bundles of 2 per fascicle and are more or less straight, up to 5 cm long. The male cones are abundant and up to 6 mm long. The female cones are ovoid, up to 7 cm long, and bear wingless hard-shelled seeds up to 4 mm long.

Habitat and range: *Pinus edulis* grows in sagebrush-grass and pinyon-juniper communities throughout Utah. It is also known from Wyoming, Colorado, Oklahoma, New Mexico, Arizona, Nevada, and Mexico.

Comments: Two-needle pinyon pine grows with Utah juniper and forms extensive woodlands in Utah, especially in the eastern half of the state. It is replaced by *Pinus monophylla* in the western counties of Utah. Two-needle pinyon pine is used for erosion control and is a major source of firewood. It also provides cover, habitat, and food for wildlife and is the primary food of the pinyon jay. The delicious seeds are commonly harvested and consumed by man. The pitch is used for sealants, adhesives, and a variety of medicinal purposes. *Pinus edulis* could be used more frequently in landscapes in dry, sunny environments; however, the pitchy character of the wood makes it somewhat of a fire hazard. It is the state tree of New Mexico. *Edulis* means “edible.”

***Pinus flexilis* E. James, Limber pine**



Description: Limber pine grows up to 20 m tall and lacks a strongly dominant main stem, thus forming rounded or broadly pyramidal trees. At treeline, the plants often survive in a shrub-like habit. The needles occur in bundles of 5. The bark on older stems is dark brown or black, furrowed, and develops larger plates, with flaking outer fragments. The male cones are reddish and up to 10 mm long. The female cones are ovoid or somewhat cylindric, up to 14 cm long, and have unarmed scales. The seeds are up to 12 mm long, with a vestigial wing.

Habitat and range: *Pinus flexilis* grows in sagebrush-grass, pinyon-juniper, Douglas fir, ponderosa pine, aspen, and spruce-fir communities at higher elevations. It rarely occurs in large stands, but is common as widely spaced individuals on exposed and windswept sites. It is found in nearly all Utah counties and is also known from British Columbia to Alberta and southward to Texas and California.

Comments: Limber pine is very hardy and may be better adapted for harsh timberline environments than any other tree. It is often twisted and crooked, and the young stems are so flexible and tough that they can be tied into knots. Clark's nutcrackers help spread the seeds. *Flexilis* means "flexible" or "limber."

***Pinus longaeva* D. K. Bailey, Western bristlecone pine**



Description: Bristlecone pines may grow up to 20 m tall. They have numerous larger lateral branches that ascend at an angle greater than 45°. Secondary branches may hang from the larger branches in pendulant clusters. The needles occur in bundles of 5, are up to 4 cm long, and have 2 resin ducts that sometimes produce resin. The bark is reddish brown. The male cones are up to 12 mm long. The female cones are up to 8.5 cm long and bear a strong prickle, up to 6 mm long, at the tip of each cone scale.

Habitat and range: Bristlecone pines usually appear as isolated individuals on windy ridges, usually on outcrops of calcareous rock. They grow in ponderosa pine and spruce-fir communities. They are found in many Utah counties and are also known from Nevada and California.

Comments: *Pinus longaeva* includes some of the longest-lived individuals on earth. Plants have been recorded having up to 5000 annual rings. Older trees are often beautifully twisted and contorted. The wood is hard and denser than that of other conifers. The seeds are distributed in part by Clark's nutcrackers. *Longaeva* means "ancient."

***Pinus monophylla* Torr. & Frém., Singleleaf pinyon pine**

Description: Singleleaf pinyon pine often grows to over 15 m tall. The central stem is only slightly more dominant than the lateral branches; thus the trees are usually broadly pyramidal or rounded. There is usually only a single needle per fascicle, and the needles are rigid, sharp pointed, and up to 3.5 cm long. The female cones are up to 5.5 cm long and broadly ovoid. The seeds are wingless, moderately thick shelled, and up to 17 mm long.



Habitat and range: *Pinus monophylla* is a codominant of the pinyon-juniper communities found in the western counties of Utah. It is also known from Arizona, Nevada, California, and Baja Mexico.

Comments: The seeds are commonly collected and sold as commercial “pinyon nuts” or “pine nuts”; they are also rapidly harvested by birds and rodents. Fire is usually quite devastating, and forests of this species may take more than 100 years to recover. Singleleaf pinyon pine is shade intolerant and may have some ornamental value in xeric landscapes. *Mono* means “single” or “one” and *phyla* means “leaf.”

***Pinus ponderosa* Douglas ex C. Lawson & C. Lawson, Ponderosa pine**



Description: Ponderosa pine is a large tree, growing up to 30 m on many sites. The central stem is strongly dominant and produces a handsome trunk. The bark becomes orange and furrowed with age, with small flakes exfoliating from the larger bark plates. The needles usually appear in bundles of 3, are 8–10 cm long, and yellow green. The male cones are yellow to purple, up to 3 cm long, and produce copious amounts of pollen. The female cones are up to 15 cm long, reddish brown, and ovate in shape. The cone scales bear a stout prickle. The seeds are up to 7 mm long, with a brownish to purplish wing.

Habitat and range: Ponderosa pine occurs in all counties except Box Elder, Davis, Morgan, and Rich. It is also found from British Columbia to the Dakotas and southward to Nebraska, New Mexico, and California.

Comments: *Pinus ponderosa* var. *scopulorum* Engelm. is the variety that occurs in Utah. It is a major lumber pine of the American West, referred to as “yellow pine.” Birds and small mammals eat the seeds. Its extensive root systems grow until they compete with roots from another tree, where they then support each other and form large groves. Older bark may smell like vanilla or pineapple. Ponderosa pine is drought resistant and intolerant of shade, and is used in landscaping. *Ponderosa* means “weighty” or “ponderous.”

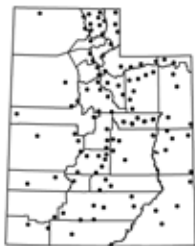
“Of all the pines, gives forth the finest music to the winds”

—John Muir

Pseudotsuga Carrière

Pseudo means “false” and *tsuga* is Latin for “hemlock.”

Pseudotsuga menziesii (Mirb.) Franco, Douglas fir



Description: Douglas fir grows up to 30 m tall. The bark is smooth and light colored when young, but becomes grayish and furrowed on older stems. The young branches are pubescent. The buds are brown and sharp pointed. The needles are single, flat, bluish green, and up to 35 mm long,

with acute to blunt tips. The male cones are up to 8 mm long and orangish. The female cones are up to 6 cm long, ovoid to cylindric, and hang down from the upper branches. The 3-pointed bracts that extend from the cone scales are diagnostic for this species. The winged seeds are up to 6 mm long, and the wings are often twice as long as the seed.

Habitat and range: *Pseudotsuga menziesii* is widespread, occurring in mountain brush, aspen, and spruce-fir forests. It is known from British Columbia and Alberta southward to Texas and California.

Comments: Douglas fir is one of the most important conifers for high-grade lumber, and thus has been much exploited over the past century. It is a suitable landscape choice for Utah. *Pseudotsuga menziesii* var. *glauca* (Mayr) Franco is native to Utah. *Menziesii* honors Archibald Menzies, a 19th-century Scottish botanist and naturalist on the Vancouver Expedition, and *glauca* means “bluish green” or “silvery gray.”



Angiosperm Descriptions

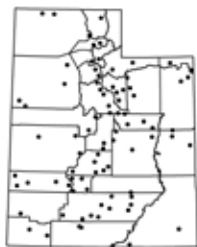
The term angiosperm commonly refers to the “flowering plants.” These vascular plants produce flowers with seeds that are enclosed and protected within a fruit (the ripened ovary of a flower). The flowers of this group are modified to disperse their pollen by wind, water, or animals. The seeds are highly adapted for various methods of dispersal. Angiosperms are adapted to nearly every environment, including aquatic to extremely arid ones, other plant surfaces (epiphytes), and even underground. Angiosperms have typically been divided into two classes, dicots and monocots. Dicots are characterized by having flower parts in multiples of four or five and leaves that usually have netted veins. Monocots usually have flower parts in multiples of three and leaves with parallel veins. There are very few monocots that have developed “woodiness,” and in Utah, only one family, Agavaceae (the yuccas and their relatives), has woody species.

ADOXACEAE—Muskroot family

The muskroot family is a small family of herbs, shrubs, and small trees. The leaves are opposite. The flowers are small, regular, usually 5 merous, and occur in umbellate or cymose inflorescences. The fruit is a drupe. Some are cultivated as ornamentals, such as *Viburnum*; some are used in jelly, syrups, and wine making (*Sambucus*). The only woody members of this family native to Utah are two species in the genus *Sambucus*, formerly in the family Caprifoliaceae.

***Sambucus* L.**

Sambucus is Greek for a musical instrument made from elderwood.

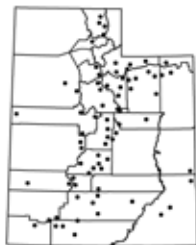
***Sambucus caerulea* Raf., Blue elderberry**

Description: Blue elderberry is a large shrub, growing up to 4 m tall. The stems are thick and filled with spongy brown pith. The leaves are opposite and compound pinnate, with up to 9 leaflets. The leaflets are up to 15 cm long and 6 cm wide, lance-ovate or elliptic, and often strongly oblique at the base. The margins of the leaflets are serrate, and the leaf surfaces are glabrous or hairy below. The inflorescences are compact, corymbose, up to 30 cm wide, and terminal on the branches. The flowers are white, have inferior ovaries, and bloom in May–July. The fruits are 4–5-seeded berries, up to 6 mm wide, subglobose, and bluish black at maturity.

Habitat and range: Blue elderberry grows in riparian, sagebrush-grass, mountainbrush, pinyon-juniper, ponderosa pine, aspen-mixed conifer, and spruce-fir communities most likely in all Utah counties, at 1370–2810 m. It also grows in Arizona, California, Nevada, New Mexico, Wyoming, and British Columbia.

Comments: Eating any part of the plant raw is not recommended, as most parts produce hydrocyanic acid. The berries make good jam and syrup once cooked. *Sambucus caerulea* is very palatable to deer and livestock after the first frost turns the leaves black. The stems have been used for flute making. It is also used as an ornamental. *Caerulea* means “dark” or “dark blue.”

Sambucus racemosa L., Red elderberry



Description: Red elderberry is a medium-sized shrub, up to 2 m tall, that produces several erect unbranched stems. The stems are up to 2 cm in diameter and have large piths. The leaves are opposite, up to 35 cm long, and pinnately compound. The leaflets (7 or fewer) are up to 17 cm long and 6 cm wide, lanceolate, elliptical, or oblong. The tips are acuminate, and the bases are unequally obtuse or acute. The leaflets are serrate, petiolate, green, and glabrous or hairy along the lower side of the midvein. The white or cream-colored flowers are borne in many-flowered paniculate cymes that have a distinct central rachis. The calyx lobes are up to 1 mm long. The corolla lobes are longer than the tube. The flowers bloom in June–July. The fruit is a berry, up to 6 mm wide, and red or sometimes dark blue at maturity.

Habitat and range: Red elderberry is found in aspen-mixed conifer and spruce-fir communities throughout Utah, at 1860–3355 m. It is also found in Alaska east to the Atlantic coast and southward to New Mexico, Arizona, and California.

Comments: This plant contains cyanide compounds and is toxic. It is resistant to air pollution and can be used as an ornamental. *Racemosa* means “flowers in racemes.”

AGAVACEAE—Agave family

This is Utah's only monocot family that includes native woody species. Most of the members of the agave family are characterized by a tight cluster of leaves at the base of the plant or at the tip of the branches. The flowering stems arise from the clusters of leaves, and the flowers are usually 3 merous. Members of this family have some economic importance as a source of fiber, food, tequila, ornamentals, soap, and medicines. In Utah, this family is represented by 3 genera (*Agave*, *Yucca*, and *Nolina*) and 11 taxa. Members of this family have been variously assigned to Asparagaceae, Liliaceae, Ruscaceae, and others.

Agave L.

Agave means “noble or illustrious one.”

Agave utahensis Engelm., Utah century plant



Description: The Utah century plant has flowering stems that rise to a height of 4 m above a rosette of short sword-like leaves. The leaves are up to 3 dm long, stiffly linear lanceolate, and concave above, with brownish stout spines along the margins and tips. This species flowers but once and then dies, and though the name suggests that this happens after 100 years, the plants usually live only 15–30 years. The flowers are yellow, with inferior ovaries, and bloom in June–July. The fruits are 3-loculed ovoid woody capsules about 2 cm long.

Habitat and range: *Agave utahensis* occurs in the most southwestern corner of Utah, at 1000–2015 m, and extends into Nevada and Arizona.

Comments: Native Americans have used the leaves of the Utah century plant for fiber. Several species are used as ornamentals in arid regions. *Utahensis* refers to Utah.

***Nolina* Michx.**

Nolina is named after Abbé Pierre Charles Nolin, an 18th-century French arboriculturist.

***Nolina microcarpa* S. Watson, Beargrass**



Description: Beargrass resembles a large coarse grass, with somewhat keeled thick leaves up to 1 m long and 12 mm wide. The leaf margins are serrulate to scabrous denticulate and fibrous at the tip. The stout flowering stems are up to 1.8 m tall, including a narrow panicle inflorescence up to 1 m long. The flowers are white, with superior ovaries, and bloom in May–July. The subglobose fruit is thin, inflated, up to 8 mm wide, and notched at both ends.

Habitat and range: *Nolina microcarpa* grows in chaparral and pinyon-juniper communities in the Mojave Desert portion of Washington Co., at 1464–1525 m. It also occurs in New Mexico, Arizona, and Mexico.

Comments: Native Americans used beargrass leaves for mats, baskets, brooms, cloth, rope, and sandals. *Microcarpa* means “small fruit.”

***Yucca* L.**

Yucca is derived from the Carib word *yuca*, meaning “cassava.” Most yuccas have symbiotic relationships with a small pronuba moth. The plants’ white blossoms open at night, when the active moth pierces the ovary and lays eggs, and then collects a ball of yucca pollen and inserts it down into the stigma, ensuring pollination. The moth larvae feed on the seeds, but many seeds are still left for plant propagation.

Yucca angustissima Engelm. ex Trel.



There are several taxonomic treatments of this species. We recognize 3 varieties in Utah. Field identification is difficult, and may rely on geography as well morphology.

Yucca angustissima var. *angustissima*, Narrow leaf yucca



Description: Narrow leaf yucca has basal leaves that may be as much as 4.5 dm long. The leaves are linear, plano-convex, and flexible, with whitish margins. The older leaves disintegrate, leaving long, strong, curling fibers. The flowering stems may be nearly 2 m tall. These stems die after the fruits ripen, but they may still persist for several years. The flowers are 3 merous and campanulate, up to 5 cm long and 3.5 cm wide, and bloom in May–July. The petals are white or pale greenish and rose or purplish dorsally. The ovary is up to 2.5 cm long, with a white or pale green style up to 13 mm long. The fruit is a capsule up to 4.5 cm long, with a deep constriction midway along its length.

Habitat and range: This variety grows on sandy soils in Mojave Desert shrub, xeric sagebrush, Colorado Plateau shrub, pinyon-juniper, and ponderosa pine communities across southern and central Utah, at 1100–2675 m. It also occurs in Arizona, Colorado, Nevada, and New Mexico.

Comments: *Angustissima* refers to the very narrow leaves.

Yucca angustissima var. *kanabensis* (McKelvey) Reveal, Kanab yucca

Description: Kanab yucca resembles other varieties of *Yucca angustissima* in most characteristics, except that its mature fruit is larger and only moderately constricted along its length. Additionally, the fruiting stalk may be as much as 2.5 m tall. The plants may form very large colonies, with procumbent stems up to 4 dm long. The peduncles may be less than 1.5 m tall and included within the leaves.

Habitat and range: This variety is found in sandy soils in Kane and Washington cos., at 1310–2290 m, and in Arizona.

Comments: *Kanabensis* refers to Kanab.

Yucca angustissima var. *toftiae* (S. L. Welsh) Reveal, Toft's yucca

Description: Toft's yucca resembles other varieties of *Yucca angustissima* in most characters, but the flowering peduncle may be very tall, as much as 4.5 m long. The inflorescence is primarily racemose and has creamy white tepals. The fruits are 4.5–6 cm long and moderately constricted. The vegetative leaves grow up to about 1 m tall. Including the flowering inflorescence, this yucca is the tallest of the acaulescent yuccas in Utah.

Habitat and range: This variety grows on sandstone outcrops and hanging gardens in warm desert shrub communities. Toft's yucca is endemic to Kane, Garfield, and San Juan cos.

Comments: *Toftiae* is named after Catherine Ann Toft, a 20th-century American botanist.

Yucca baccata Torr., Datil yucca



Description: The leaves are up to 7 dm long and 5 cm wide, rigid, straight or incurved, widest near the middle, somewhat concave, green, sometimes blue green, and usually bear long strong fibers along their margins. The flowering stalks may be up to 6.5 dm tall and are typically subequal to or a bit taller than the leaves. The flowers are campanulate and spread downward from the stem, with cream-colored tepals, usually tinged purplish. Each flower segment may be up to 8 cm long and 3 cm wide, blooming in April–June. The ovary is up to 7 cm long, narrowly rounded, and tapered to the style, which is up to 10 mm long. Mature fruits are fleshy (sometimes spongy), indehiscent, and up to 17 cm long.

Habitat and range: Datil yucca grows on rocky slopes in xeric sagebrush-grass, pinyon-juniper, and ponderosa pine communities. It occurs in the southernmost tier of counties in Utah, at 1525–2135 m, and in much of the southwestern United States and Mexico.

Comments: The seeds of *Yucca baccata* are eaten and spread by pack-rats and rabbits. Native Americans and others use the flowers and fruits for

food; the leaves as a source of fiber for cordage, mats, sandals, baskets, and cloth; and the roots for soap. Datil yucca requires a specific pollinator, the yucca pronuba moth. *Baccata* refers to the pulpy, juicy fruit.

***Yucca baileyi* Wooten & Standl., Bailey's yucca**



Description: The leaves are up to 6 dm long and to 8 mm wide, linear, plano-convex, flexible, often sickle shaped, and pale green, with whitish margins and long strong fibers hanging from the margins. The flowering stalks are up to 1.2 m tall, arising within or just above the leaves. The racemose inflorescence is densely flowered, with campanulate blossoms that are greenish white, tinged with purple. The flowers are up to 6 cm long and 3 cm wide and bloom in April–June. The ovary is superior, up to 3 cm long, and obovoid, with a white to pale green style up to 9 mm long. The fruits are up to 7 cm long and 5 cm wide, usually not constricted.

When mature, the fruits are pendulous and dehisce spontaneously.

Habitat and range: Bailey's yucca grows in xeric sagebrush-grass, Colorado Plateau shrub, pinyon-juniper, and ponderosa pine communities in Garfield, Grand, Kane, and San Juan cos., at 1200–2200 m. It also occurs in Arizona, Colorado, and New Mexico.

Comments: *Baileyi* is named after Vernon Orlando Bailey, chief naturalist of the U.S. Biological Survey from 1899 to 1933.

Yucca brevifolia Engelm., Joshua tree



Description: The Joshua tree grows as an open-crowned evergreen tree. The leaves are linear, up to 3 dm long, and spine tipped. The flowers appear in short compact-panicle rosettes at the stem tips, and are up to 4.5 cm long, greenish white to cream colored, thick and succulent, and bloom in April–May. The ovaries are up to 3.5 cm long and taper to a narrow tip. The fruit is an ellipsoid capsule up to 8.5 cm long and 4.5 cm wide. At maturity, the fruits are dry or spongy and indehiscent.

Habitat and range: This uniquely shaped tree is conspicuous in the warm deserts of the Mojave region and throughout the American Southwest. In Utah it is found only in Washington Co., at 800–1710 m, and it also occurs in Arizona, California, Nevada, and Mexico.

Comments: Joshua trees are an indicator species of the Mojave Desert and a unique feature of the arid landscapes they occupy. They may live for 100–300 years. *Yucca brevifolia* was named “Joshua tree” by early Mormon pioneers, because it reminded them of a Biblical story in which Joshua raises his hands up to the sky in prayer. Birds, woodrats, and small night lizards make their home in the Joshua tree. *Brevifolia* refers to the short leaves.

Yucca harrimaniae Trel., Harriman's yucca

Description: The leaves of Harriman's yucca are usually less than 5 dm long and 4 cm wide. The margins are fibrous and white or brown with age. The inflorescence is racemose, may grow to 7 dm tall, and extends well above the leaves. The flowers are up to 5 cm long and 3.5 cm wide, yellowish or greenish cream, often tinged with purple, and bloom in April–July. The ovary is up to 2 cm long and green, with a style up to 11 mm long. The fruit is a cylindric capsule, deeply constricted at midlength, and up to 5 cm long.

Habitat and range: Harriman's yucca occurs throughout much of Utah, at 1220–2380 m. It is also found in Arizona, Colorado,

Nevada, and New Mexico.

Comments: Some authors suggest that two varieties of this species occur in Utah. *Yucca harrimaniae* var. *harrimaniae* is found primarily on the Colorado Plateau, and *Yucca harrimaniae* var. *gilbertiana* Trel. is more common in western Utah. Harriman's yucca is the state flower of New Mexico. *Harrimaniae* honors Edward Henry Harriman, the sponsor of the Harriman Alaska Expedition at the end of the 19th century.

Yucca schidigera Ortgies, Mojave yucca



Description: Mojave yucca usually grows in clumps, with individual plants up to 2.5 m tall, often with a single stem. The thick rigid leaves are up to 10 dm long, linear lanceolate, concave-convex in cross section, and yellowish green. Strong curved fibers persist along the leaf margins. The paniculate inflorescence is usually contained within the leaves. The flowers are white or cream colored, with a purplish tint, and bloom in April–May. The tepals are up to 4.5 cm long and 1 cm wide. The ovary is up to 2.5 cm long, with a short style (to 2 mm). The fruit is a cylindric capsule up to 10.5 cm long, tapered to the tip, and fleshy at maturity.

Habitat and range: *Yucca schidigera* grows on gravelly soils at the base of slopes in Mojave Desert shrub communities in Washington Co., at 1075–1220 m. It also occurs in Arizona, Nevada, and southeastern California.

Comments: Mojave yucca does well in well-drained soils in arid landscapes. It is pollinated by female moths of the genus *Tegeticla*. *Schidigera* means “spine bearing.”

Yucca utahensis McKelvey, Utah yucca

Description: Utah yucca is a low-growing, somewhat caulescent plant that usually produces prostrate stems up to 1.3 m long. The stems give rise to several rosettes of yellowish green leaves that are linear, up to 7.5 dm long and 20 mm wide, widest near the middle, and concave-convex in cross section. The leaf margins are white and bear few adherent fibers. The inflorescence is paniculate and up to 2 m long, with the peduncle extending well above the leaves. The cream-colored flowers are campanulate, up to 5 cm long, and bloom in April–June. The tepals are up to 2.5 cm wide and elliptic to ovate. The ovaries are up to 3 cm long, with a slender style up to 1 cm long. The fruit is a dehiscent cylindric capsule, up to 7 cm long and 2.5 cm wide, sometimes showing a slight constriction at midlength.

Habitat and range: Utah yucca grows on sandy soils in Mojave Desert shrub or pinyon-juniper communities in western Washington Co., at 850–2200 m, and in adjacent Arizona and Nevada.

Comments: Native Americans made soap from the roots and obtained fibers from the leaves of *Yucca utahensis*. *Utahensis* refers to Utah.



AMARANTHACEAE—Pigweed family

The pigweed family is a widespread family that includes shrubs, subshrubs, herbs, and very few trees or vines. There are some succulent forms. Most species are tropical or subtropical, with some temperate species. Many members of this family are important components of arid and semiarid deserts, especially those with alkaline or saline soils. The flowers are tiny, inconspicuous, and wind pollinated. Many members of this family have C4 photosynthetic pathways, as well as Crassulacean Acid Metabolism (CAM) similar to that in Cactaceae. They often contain betalins (nitrogen-containing pigments) and alkaloids. The pollen from these species causes troublesome allergies in many people. Some members of this family are edible (quinoa, spinach, chard, beets, and sugar beets). Others are “weedy” and introduced, such as pigweed and lamb’s quarter (*Chenopodium* spp.), Russian thistle (*Salsola*), and purslane (*Portulaca*). Many species have successfully moved onto saturated soils that are 5–6 times higher in salt content than seawater. Plants that have adaptations for salty soils are referred to as “halophytes” (salt-loving). In this guide, Chenopodiaceae is considered a subfamily of the Amaranthaceae family, and it is very well represented in Utah.

***Allenrolfea* Kuntze**

Allenrolfea is named after Robert Allen Rolfe, a mid 19th- to early 20th-century British botanist.

***Allenrolfea occidentalis* (S. Watson) Kuntze, Pickleweed**

Description: Pickleweed is suffrutescent, usually 3–8 dm tall, with succulent stems that store salt taken up from the soil. The stems are alternate, with the leaves reduced to mere scales. The plant crowns and the bases of the persistent stems become woody, while most succulent stems are dropped each year. The flowers lack petals and are borne in dense spikes, up to 3 cm long, that bloom midsummer–late fall. The fruit is an ovoid utricle up to 1 mm in diameter.

Habitat and range: *Allenrolfea occidentalis* is found throughout Utah, at 950–1800 m, on sites where highly saline soils are accompanied by high water tables throughout the year. It often forms hummocks on salt playas and mudflats by capturing wind-blown sand. Pickleweed occurs in much of western North America.

Comments: *Occidentalis* means “of the west.”

***Atriplex* L.**

Atriplex is Latin for “saltbush.” Some members of this genus are monoecious, some dioecious, or even trioecious, the latter being the case when male, female, and bisexual flowers occur on different plants.

***Atriplex canescens* (Pursh) Nutt.**

There are 2 varieties that occur in Utah.



Atriplex canescens var. *canescens*, Fourwing saltbush



Description: Fourwing saltbush grows up to 2 m tall, with stems that typically lack spines. The leaves are alternate, nearly sessile, up to 4 cm long, linear to oblanceolate, and oblong to obovate, with entire margins. The flowers are monoecious and bloom in spring–fall. Staminate flowers are yellow and borne in terminal panicles or axillary spikes 2–3 mm wide. Pistillate flowers are borne in panicles 5–40 cm long. The fruiting bracteoles have 4 prominent wings that are usually toothed at the apex and enclose a single-seeded fruit. The seeds may be up to 2.5 mm in diameter.

Habitat and range: Fourwing saltbush occurs in xeric sagebrush, salt desert shrub, and Colorado Plateau shrub communities throughout most of Utah, at 670–2380 m. It also is found in much of western North America.

Comments: This variety is an excellent soil stabilizer and a regular component of range-reseeding mixtures for sagebrush, pinyon-juniper, and mountainbrush sites. It is a food plant for the rare San Emigdio blue butterfly. The plants are predominately tetraploids, although diploid and hexaploid types are not uncommon, and other “ploides” have been documented. Fourwing saltbush forms hybrids with *Atriplex confertifolia* and *A. gardneri*. *Canescens* means “becoming white or gray.”

Atriplex canescens var. *gigantea* S. L. Welsh & Stutz, Giant fourwing saltbush



Description: Giant fourwing saltbush shares the vegetative characteristics of *Atriplex canescens* var. *canescens*, but the former is dioecious and somewhat more robust. The plants show a tendency to produce layering branches, with few spines. The flowers bloom in summer–fall. The fruiting bracts are very large, 12–25 mm wide.

Habitat and range: Giant fourwing saltbush is restricted to sand dunes, usually in interdunal valleys or active leeward dune margins, in sand dune environments of west-central Utah, at 1490–1555 m. It is endemic to Juab Co.

Comments: This variety is a genetic diploid. It is well adapted to moving sand and much of its body is under the sand. Adventitious roots and layering prevent it from being buried. It grows with other sand dune species, such as *Psoralea lanceolata* and *Achnatherum hymenoides*. *Gigantea* means “large.”

Atriplex confertifolia (Torr. & Frém.) S. Watson, Shadscale

Description: Shadscale is a very spiny shrub, up to 8 dm high but usually smaller. The plants are rounded and produce several branches at ground level. They are typically dioecious. The leaves are persistent and orbicular or ovate, with short petioles up to 4 mm long. The blades are pale green to grayish, up to 25 mm long, with entire margins. The inflorescences are panicle, up to 15 cm long, and bear staminate yellow flowers in clusters up to 4 mm in diameter that bloom in spring–fall. The female flowers bear 2 bracts that are ovate to orbicular, up to 13 mm long, and similar in color to the leaves. The bracts are pressed together at the base but tend to flare out distally.



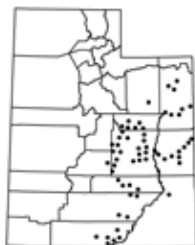
Habitat and range: Shadscale is widespread in western North America and often dominant on the saline soils of valley floors in arid regions. It occupies salt desert shrub, xeric sagebrush, and pinyon-juniper communities in and has been collected in all Utah counties except Morgan and Summit, at 850–2140 m.

Comments: *Atriplex confertifolia* is palatable to big game and domestic livestock, but it is protected from abusive herbivory by its stiff spines. The species increases under heavy grazing. It commonly forms hybrids with *A. garrettii* in the range of *A. garrettii*, and most likely hybridizes with other perennial *Atriplex* species. *Confertifolia* means “crowded or dense leaves.”

***Atriplex corrugata* S. Watson, Mat saltbush**

Description: Mat saltbush is usually a dioecious (or sometime a trioecious) low-spreading shrub. The plants are rarely more than 15 cm tall, but they may have a branching diameter of over 1 meter. The leaves are opposite below and alternate above, linear to oblanceolate, up to 18 mm long, grayish, and persistent. The flowers bloom in spring–fall. The fruits are produced on bracteate spiciform inflorescences, with bracts that are tuberculate or smooth and to 5 mm long.

Habitat and range: Mat saltbush is often the dominant plant on the sparsely vegetated expanses of Mancos shale and similar clay soil substrates on the Colorado Plateau of eastern Utah, at 1220–2150 m. It also occurs in Colorado and New Mexico.



Comments: *Atriplex corrugata* is an important forage plant, especially in winter. It may form interspecific hybrids with *A. confertifolia* and *A. gardneri* var. *cuneata*, as well as with other perennial *Atriplex* species. *Corrugata* means “having folds, wrinkles, or ridges.”

***Atriplex gardneri* (Moq.) D. Dietr., Gardner’s saltbush**

Gardneri is named after Alexander Gordon, who collected the type specimen, but Moquin, the author who published the original name in 1849, misread the specimen label as “Gardner.”



Photo by Walt Fertig

Description: Gardner’s saltbush includes unarmed shrubs or subshrubs up to 10 dm tall. They may be monoecious, dioecious, or trioecious. The

leaves are usually alternate (the proximal leaves may be opposite, subopposite, or alternate), linear to oblanceolate, obovate, spatulate, or orbicular. The leaf tips are obtuse to rounded or retuse, the bases are cuneate, and the margins are entire. Staminate flowers are dark brown to tan or yellow, arranged in spikes or panicles, and bloom in spring–fall. The fruiting bracteoles may have tubercles and/or wings or (rarely) are smooth. Most occur in fine-textured saline soils throughout the Intermountain region and Great Plains. The following key may be helpful in distinguishing the six varieties recognized in Utah:

Key to Varieties of *Atriplex gardneri*

- 1a Leaves usually sessile or subsessile and mostly more than 5 times longer than wide.....**2**
- 1b Leaves with petioles 2–12 mm long; blades mostly less than 5 times longer than wide.....**4**
- 2a Stems usually ascending, up to 8 dm tall; fruiting bracteoles with 4 lateral wings or rows of tubercles; valleys and playas, salt desert shrub community, in Juab and Millard cos., at 1500–1585 m (Bonneville saltbush) ..**var. *bonnevilensis***
- 2b Stems usually decumbent or prostrate, less than 5 dm tall; fruiting bracteoles lacking wings; tubercles dense to absent**3**
- 3a Leaves 5–10 times longer than wide; male flowers usually brown; fruiting bracteoles lanceolate, with acuminate tips, apical teeth united for 1/2 the length, and lateral teeth lacking; salt desert shrub community in the Great Basin; Rich Co., 1300–2410 m (Jones' saltbush).....**var. *falcata***
- 3b Leaves usually 5–15 times longer than wide; male flowers usually yellow or tan; fruiting bracteoles flattened or subglobose, apical teeth free, subtended by 2–6 lateral teeth; Grand Co., 1280–1315 m (Welsh's saltbush).... **var. *welshii***
- 4a Subshrubs up to 10 dm tall; proximal leaves mostly alternate; male flowers usually yellow; fruiting bracteoles more or less flattened and cuneate, with a terminal tooth up to 2 mm long and subtended by 2–11 lateral teeth; widespread in western and northern Utah (basin saltbush)..... **var. *utahensis***
- 4b Subshrub up to 4.5 dm tall; proximal leaves opposite or subopposite; male flowers usually dark brown; eastern Utah.....**5**
- 5a Leaves green, up to 1.2 cm wide; petioles 2–12 mm long; bracteoles usually densely tuberculate; Mancos Shale Formation in Uintah and Navajo basins, at 1220–2120 m (Castle Valley saltbush)**var. *cuneata***
- 5b Leaves grayish green, up to 2.5 cm wide; petioles 1–4 mm long; tubercles lacking or very short; Daggett and Rich cos., at 1890–2420 m (Gardner's saltbush).....**var. *gardneri***

Comments: Gardner's saltbush is composed of a complex of closely related shrubs or subshrubs with great variation in their chromosome numbers, including diploids, triploids, tetraploids, hexaploids, and higher polyploids (all multiples of the base number 9). They hybridize with taxa within the complex, as well as with other perennial *Atriplex* species.

Atriplex gardneri var. *bonnevilensis* (C. A. Hanson) S. L. Welsh. *Bonnevilensis* refers to Lake Bonneville.

Atriplex gardneri var. *cuneata* (A. Nelson) S. L. Welsh. *A. gardneri* var. *cuneata* is a codominant with *A. corrugata* on the Mancos Shale Formation. It is known to hybridize with *A. canescens*, *A. confertifolia*, *A. gardneri* var. *utahensis*, and other species of perennial *Atriplex*. *Cuneata* means “wedge shaped.”

Atriplex gardneri var. *falcata* (M. E. Jones) S. L. Welsh. *Falcata* means “sickle shaped.”

Atriplex gardneri var. *gardneri*. Usually on Mancos shale in Daggett and Rich cos.

Atriplex gardneri var. *utahensis* (M. E. Jones) Dorn. *Utahensis* means “of Utah.”

Atriplex gardneri var. *welshii* (C. A. Hanson) S. L. Welsh. *Welshii* is named after Stanley Larson Welsh, a present-day Utah botanist.

***Atriplex garrettii* Rydb., Garrett's saltbush**



Description: Garrett's saltbush grows as a spineless, small to medium-sized shrub up to 6 dm tall. The leaves are mostly opposite or subopposite, sometimes alternate. The yellow-green and somewhat scurfy leaf blades are up to 53 mm long and 32 mm wide, lanceolate, elliptical, or nearly orbicular, with margins that are entire to dentate. The leaves are obtuse to cuneate basally, with the tips acute to rounded or emarginate. The plants are strictly dioecious, with male flowers produced in panicle inflorescences up to 8 cm long, blooming in spring-fall. The stamens form in clusters that are brownish, or occasionally yellow. The female flowers arise from panicles up to 30 cm long. The fruit is 4-winged, up to 10 mm long, with a smooth or reticulate surface.

Habitat and range: Garrett's saltbush occurs in salt desert shrub and Colorado Plateau shrub communities. It is confined to sandy slopes of the Colorado River canyons and tributaries, from Arches National Park to the Grand Canyon, at 1100–1900 m.

Comments: Utah's variety is *Atriplex garrettii* var. *garrettii*. This species hybridizes with *A. confertifolia* and other species of perennial *Atriplex*. Much of its habitat was lost when Lake Powell was created. *Garrettii* is named after Albert Osburn Garrett, an early 20th-century Utah botanist.

Atriplex hymenelytra (Torr.) S. Watson, Desert holly



Description: Desert holly is a dioecious shrub that may grow to 15 dm tall. The branches are unarmed and produce leaves that are petiolate, persistent, up to 4 cm long and equally wide, orbicular to reniform, greenish to grayish in color, and permanently scurfy. The margins are dentate. The flowers appear February–March. The male flowers are yellow to purplish and form clusters that are up to 4 mm wide, arising from panicle inflorescences up to 3 dm long. The female flowers have bracteoles up to 1 cm long and are orbicular or reniform, with margins that are entire or crenate. The fruits have sessile bracteoles, are orbicular to reniform, and are similar to those of *A. confertifolia*. The seeds are brown and ca. 2 mm long.

Habitat and range: Desert holly grows in Mojave Desert shrub communities throughout the Southwest. In Utah, it occurs only in Washington Co., at about 730 m.

Comments: *Atriplex hymenelytra* is a beautiful shrub that often looks silvery, and almost pink, on the Mojave Desert floor. It is said to be the most drought-tolerant of all the North American saltbushes. The silvery-white leaves and the steep angle of the leaves greatly reduce the amount of heat and light reaching the plants. They can live in the driest and hottest parts of the Mojave Desert. *Hymenelytra* means “a membranous covering or sheath.”

Atriplex lentiformis (Torr.) S. Watson, Big saltbush



Description: Big saltbush is an unarmed dioecious shrub that may grow up to 25 dm tall. The leaves are alternate, petiolate, persistent, up to 4 cm long and 3 cm wide, deltoid to triangular-ovate or oblong-elliptic, gray green, and scurfy. The margins are entire or subhastate, and the tips are rounded to obtuse. The male flowers arise in panicles up to 5 cm long and form yellow clusters up to 2 mm wide. The pistillate flowers appear in inflorescences up to 5 cm long and bloom in spring–fall. The fruiting bracts are up to 4 mm long and equally wide, sessile, and orbicular to ovate, with rounded tips and crenulate margins. The seeds are up to 1.5 mm wide.

Habitat and range: In Utah, big saltbush occurs only in Washington Co., at 760–950 m. It occupies sites along drainage ways, stream margins, and other moist sites in Mojave Desert shrub communities and other deserts of the American Southwest.

Comments: *Lentiformis* means “lentil shaped.”

Atriplex obovata Moq., New Mexico saltbush

Description: New Mexico saltbush is a dioecious shrub that grows up to 8 dm tall on better sites, but is usually smaller. The leaves are alternate throughout, short petioled, up to 3 cm long and 2 cm wide, and obovate, elliptic, or orbicular. The tips are rounded to retuse, and the margins are entire or sometimes crenate or dentate. The male flowers are borne in panicles up to 30 cm long, in yellow clusters up to 3 mm wide, and bloom in summer–fall. The fruiting bracts are sessile, broadly cuneate, and up to 5 mm long and 9 mm wide. The bract surfaces are smooth, or rarely tuberculate, and the margins are entire. The fruit bracts have an apical tooth and 2–6 similar teeth below the tip. The seeds are up to 1.5 mm wide and brownish.



Habitat and range: New Mexico saltbush occurs in San Juan Co., Utah, at 1525–1650 m, and is widespread in Arizona, New Mexico, and Mexico. *Atriplex obovata* is found on shale substrates in salt desert shrub, Colorado Plateau shrub, and pinyon-juniper communities.

Comments: *Obovata* refers to the obovate-shaped leaf.

Atriplex polycarpa (Torr.) S. Watson, Desert saltbush



Description: Desert saltbush is a dioecious or trioecious shrub that may grow up to 2 m tall. The leaves are tardily deciduous, spatulate or obovate, and up to 15 mm long. The margins are entire, and the tips are usually acute. The male flowers occur on panicle spikes 5–25 cm long

and appear silvery prior to the appearance of the yellowish anthers. The flowers bloom in spring–fall. The fruits are sessile, cuneate-orbicular to semicircular. The fruit bracts are tuberculate (or occasionally smooth), up to 2.5 mm long, with margins that are deeply lacinate and fused to near the middle. The seeds are up to 1.5 mm long and pale brown to gray.

Habitat and range: Desert saltbush grows in Mojave Desert shrub communities in Washington Co., at 775–850 m. It occurs in similar communities on fine-textured soils throughout the Mojave and Sonoran deserts of the Southwest.

Comments: Desert saltbush may form hybrids with *Atriplex lentiformis*. *Polycarpa* means “many fruits.”

Atriplex torreyi (S. Watson) S. Watson, *Torrey’s saltbush*



Description: Torrey’s saltbush is a large shrub, growing up to 3 m tall. Young branches are somewhat square in cross section and bear blunt thorns. The leaves are alternate, persistent, and deltoid to elliptic, with short petioles. The leaf blades are up to 3 cm long and 1.6 cm wide. The margins are usually entire, the tips are obtuse, and the leaf bases are obtuse, or rarely hastate. The inflorescences are panicle and up to 3 dm long. The male flowers are yellow and form small clusters ca. 1 mm in diameter. The female flowers are sessile. The fruits are orbicular, with bracts up to 3 mm long and 3 mm wide.

Habitat and range: Torrey’s saltbush grows in Mojave Desert shrub communities in Washington Co., at 800–900 m. It also occurs in Arizona, Nevada, and California.

Comments: *Torreyi* is named after John Torrey, a 19th-century American botanist and teacher of Asa Gray.

Grayia Hook. & Arn.

Grayia is named after Asa Gray, a prominent 19th-century American botanist.

***Grayia spinosa* (Hook.) Moq., Spiny hopsage**

Description: Spiny hopsage is a dioecious (rarely monoecious) shrub that grows up to 1.2 m tall. The young branches are gray brown and somewhat spiny. The older stems are whitish and bear long strips of exfoliating bark. The leaves are short petioled, up to 3 cm long and 12 mm wide, oblanceolate, with entire margins, deciduous, polished green above, and somewhat paler below. The staminate flowers have a 4-lobed perianth and 4 stamens. Female plants bear flowers in spicate panicles that bloom in spring–summer. The fruits are orbicular or cordate, with clear thickish bracts up to 15 mm wide. The fruits may be greenish, yellowish, or red tinged and are widely dispersed by wind.

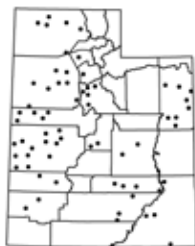
Habitat and range: Spiny hopsage grows in Mojave Desert shrub, xeric sagebrush, salt desert shrub, Colorado Plateau shrub, and pinyon-juniper communities. It occurs in much of the state, at 760–2900 m, and in the western United States and northern Mexico.

Comments: *Grayia spinosa* is palatable to large hoofed mammals and common enough to be an important forage plant, especially in salt desert shrub communities. It is a very attractive plant in fruit. *Spinosa* means “full of spines.”

Kochia Roth

Kochia is named after W. D. J. Koch, a director of the Erlangen Botanical Garden in Germany.

***Kochia americana* S. Watson, Gray molly**



Description: Gray molly is a small subshrub, occasionally growing up to 3 dm tall. The leaves are up to 25 mm long and 2 mm wide, linear, semiterete, and grayish green. The spicate inflorescences bear 1–4 flowers per axil that bloom in summer–fall. The inflorescence often accounts for 1/2 of the stem length. The fruits are hairy, up to 2 mm long and 3 mm wide.

Habitat and range: Gray molly occurs in salt desert shrub and xeric sagebrush communities throughout Utah, at 1125–1985 m. It also is found in Arizona, California, Montana, New Mexico, and Oregon.

Comments: *Kochia americana* provides forage for sheep and deer. It often dries to a black color. It occupies somewhat disturbed habitats. It is known to form hybrids with *Kochia scoparia*. *Americana* refers to the United States.

Kochia prostrata** (L.) Schrad., Forage kochia

Description: Forage kochia is gray green and up to 7.5 dm tall. The branches are not prostrate (as the common name suggests), but rather are erect or ascending. The leaves are up to 12 mm long and ca. 1 mm wide, covered with hairs that are silvery and straight or crinkled. The inflorescence is a spicate panicle, up to 2 cm long. The flowers bloom in spring–summer. The fruit is hairy, orbicular, somewhat reddish, and up to 1 mm long and 1.5 mm wide.

Habitat and range: Forage kochia is an introduced subshrub from Eurasia, but it is widely planted in revegetation projects throughout Utah and



Photo by Sherel Goodrich

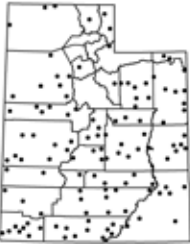
adjacent states. It is found in reseeded cover on lands that previously supported shadscale or pinyon-juniper vegetation, at 1325–1770 m.

Comments: *Kochia prostrata* has been used extensively as an introduced range plant. It is considered an invasive weed by some and may become problematic on native landscapes. *Prostrata* means “prostrate” or “lying flat on the ground.”

***Krascheninnikovia* Gueldenst.**

Krascheninnikovia is named after Stephan (Stepan) Petrovich Krascheninnikov, an 18th-century Russian botanist.

***Krascheninnikovia lanata* (Pursh) A. Meeuse & A. Smit, Winterfat**



Description: Winterfat is a monoecious subshrub that may grow up to 3 dm tall. The leaves bear stellate pubescences in such density that the plants appear more silvery than green. The leaves are up to 5 cm long and 6.5 mm wide, linear to lanceolate, with margins that are entire and somewhat revolute to almost flat. The flowers, borne in dense axillary clusters in spicate inflorescences at the branch tips, appear in May–July. The fruiting bracts are 3–6 mm long and obscured by long hairs.

Habitat and range: Winterfat occurs in all Utah counties except Davis, Morgan, and Weber, at 730–2840 m, and from the Yukon to northern Mexico in western North America.

Comments: Winterfat is one of the most desirable winter browse plants for domestic animals and wildlife, and thus is a valuable forage plant. *Lanata* means “woolly.”

Suaeda Forssk. ex J. F. Gmel.

Suaeda is an Arabic name for the species *Suaeda vera*.

Suaeda nigra (Raf.) J. F. Macbr., Bush seepweed



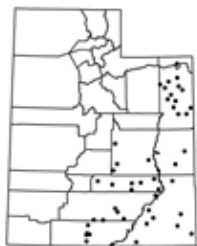
Description: Bush seepweed is a subshrub or shrub that grows up to 6 dm tall. The small leaves are succulent, glaucous, and glabrous or minutely hairy. The leaves are linear, subterete, up to 2 cm long, and abruptly narrowed to a very short petiole. The flowers are sessile, in clusters of 1–5 that appear in the leaf axils, and bloom in July–September. The calyx is ca. 2 mm across. The fruits are utricles.

Habitat and range: Bush seepweed grows in salt desert shrub communities in much of Utah, at 1125–1955 m. It also occurs in Arizona, California, Nevada, Wyoming, and Mexico.

Comments: There is great variation in morphological and ecological characters across the range of *Suaeda nigra*. Salt collects in the leaves and, when they fall, it increase the salinity of the soils and limits the growth of other seedlings, except for salt-tolerant species. Native Americans extracted a black dye from the stems. *Nigra* means “dark” or “black.”

Zuckia Standl.

Zuckia is named after the collector of the type specimen, Myrtle Zuck.

***Zuckia brandegeei* (A. Gray) S. L. Welsh & Stutz, Brandegee's siltbush**

Brandegee's siltbush inhabits fine-textured saline or seleniferous substrates. Three varieties are recognized in Utah.

***Zuckia brandegeei* var. *arizonica* (Standl.) S. L. Welsh, Arizona siltbush**

Description: This variety grows up to 5 dm tall, forming rounded shrubs, with numerous erect or ascending branches arising from a perennial woody base. The foliage is scurfy and slivery green. The leaves are sessile and linear or narrowly oblanceolate or elliptic, up to 4.2 cm long. The leaf margins are entire, and the bases are rarely hastate. The inflorescence occasionally has some moniliform hairs. The male flowers are about 2 mm long. The female flowers have bracts flattened around a small utricle-type fruit. The achenes are horizontal.

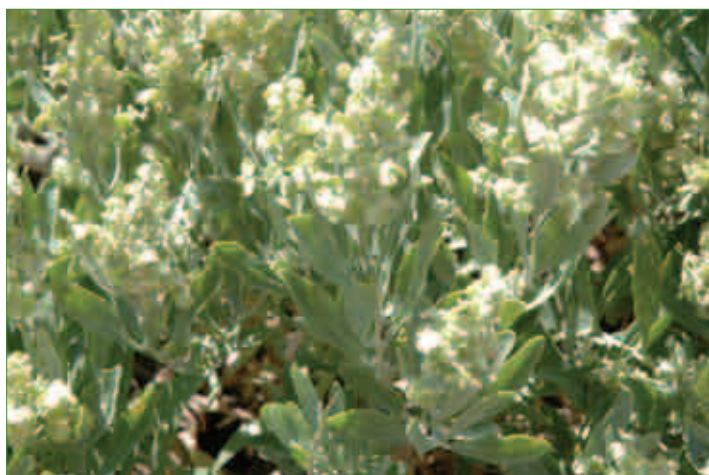
Habitat and range: Arizona siltbush grows on clay soils that are saline, gypsiferous, and seleniferous. It occurs in eastern and central Utah, at 1600 m. It also grows in northeastern Arizona.

Comments: *Arizonica* means "of Arizona."

***Zuckia brandegeei* var. *brandegeei*, Brandegee's siltbush**

Description: This variety shares most of the vegetative characters with *Z. brandegeei* var. *arizonica*, but it differs in having the utricle held vertically in the fruiting bracts. The bracteoles are usually 2(4)-winged and samara-like. The leaves of var. *brandegeei* are up to 6 mm wide.

Habitat and range: This variety is known from eastern and central Utah, at 1250–2440 m, and nearby areas in Arizona and Colorado.



Comments: Brandegee's siltbush has potential for revegetation on disturbed sites. *Brandegeeii* is named after Townsend Stith Brandege, a mid-19th- to early 20th-century American explorer and botanist.

Zuckia brandegeei var. *plummeri* (Stutz & S. C. Sand.) Dorn, Plummer's siltbush



Description: This variety shares most of the vegetative characters with the other two varieties of *Zuckia*. It differs from var. *arizonica* in that the fruit is held vertically between the fruiting bracts. It differs from var. *brandegeei* in having leaves that are usually wider than 6 mm. It is similar to var. *brandegeei* in that the bracteoles are 2(4)-winged and samara-like. Like the other two varieties of the species, var. *plummeri* grows on clay soils that are moderately saline, gypsiferous, and seleniferous.

Habitat and range: Plummer's siltbush has been collected in eastern Utah, at 1525–2300 m, and on the Colorado Plateau in Colorado, New Mexico, and Wyoming.

Comments: *Plummeri* is named after Sarah Allen Plummer, a botanist and wife of 19th-century botanist John Gill Lemmon.



ANACARDIACEAE—Cashew family

The cashew family consists mostly of trees and shrubs common in tropical or subtropical regions. The leaves and branches of nearly 30% of the genera in this family are resinous and produce chemicals that cause a rash and other allergic reactions. Some are edible (mangos, cashews, and pistachios) and others have beneficial medicinal value. In Utah, three species are native, and one species was introduced and has become naturalized.

***Pistacia* L.**

Pistacia is Greek for “nut.”

Pistacia atlantica** Desf., Atlas pistachio

Description: Atlas pistachio is an uncommon introduced tree, occurring primarily in Washington Co. The leaves are compound and odd pinnate, with 3–11 lanceolate to ovate leaflets. The leaf rachis is narrowly winged. Its small greenish flowers lack petals and are borne on axillary panicles, blooming in late March–April. The thin-fleshed fruit is an ellipsoid or ovoid drupe, reddish to blackish, and 4–8 mm long.

Habitat and range: This species is cultivated as a street tree in Washington Co., and it has become naturalized in this county.

Comments: The species is a drought-tolerant, sun-loving tree introduced from the Mediterranean. It is often used as rootstock for the commercial pistachio. *Atlantica* refers to the Atlantic.

***Rhus* L.**

Rhus is Greek for “sumac.”

***Rhus aromatica* Aiton, Skunkbush**

Skunkbush has two varieties that occur in Utah.

***Rhus aromatica* var. *simplicifolia* (Greene) Cronquist, Simple leaf squawbush**



Description: Simple leaf squawbush grows as a spreading dark green shrub, up to 2.5 m tall. The leaves are simple and up to 20 mm long and 17 mm wide, with subpalmate venation. The bark on young stems is brown, becoming gray and smooth with age. The flowers appear in tight clusters borne on short lateral branches and bloom in late March–May, before the leaves appear. Individual flowers are small, and bear short sepals and yellowish petals. The fruits are drupes, 5–8 mm long, becoming reddish to orange at maturity.

Habitat and range: This variety grows in Colorado Plateau shrub, mountainbrush, and pinyon-juniper communities, on dry rocky sites across southern, central, and western Utah, at 975–1925 m.

Comments: Ecologically, simple leaf squawbush is an important soil stabilizer and provides good bird cover, but it is generally considered a poor browse plant for wildlife. Birds and mammals readily harvest the fruits. These fruits have been used for food, have provided many thirsty travelers with a “lemonade-like” flavor to their drinking water, and are a source of vitamin C. The stems and roots of var. *simplicifolia* are a good source of natural dyes. This plant has been known to cause minor skin irritation. Because of its attractive fall color, it is a good landscaping species. *Aromatica* means “aromatic” and *simplicifolia* refers to the simple leaf.

Rhus aromatica var. *trilobata* (Nutt.) A. Gray, Squawbush

Description: This variety differs from var. *simplicifolia* in having leaves that are compound, with 3 leaflets. Otherwise they are similar.

Habitat and range: The two varieties overlap in geographic range, but var. *trilobata* occurs on better-watered sites within that range; thus it prefers stream banks and slope bases. Squawbush grows in most Utah counties, at 885–2380 m. It is also found in much of western North America.

Comments: *Trilobata* refers to the trifoliate leaf.

Rhus glabra L., Smooth sumac

Description: Smooth sumac is a clonal species that rarely grows taller than 1.3 m, but clones may be 30 m or more in diameter. The individual plants are usually single stemmed and produce odd-pinnately compound leaves up to 46 cm long. The leaves may have up to 29 lance-oblong

leaflets, with serrate margins. The flowers occur in compact terminal panicles and bloom in May–July. The fruits are large-seeded, thin-fleshed drupes up to 4 mm in diameter.

Habitat and range: Smooth sumac occurs in sagebrush-grass, riparian, mountainbrush, and pinyon-juniper communities throughout Utah, at 1095–2290 m. It is widespread in North America and native to every U.S. state except Alaska and Hawaii.

Comments: Smooth sumac often occurs as a seral species on disturbed sites and abandoned fields. It readily sprouts after fire. This species is widely used in ornamental plantings. The leaves turn fiery red at the end of the growing season. Birds and mammals readily harvest the fruits. Methanol extracts from ground-up branches contain compounds found to be effective against 11 species of bacteria (Saxena et al. 1994). *Glabra* means “smooth.”

***Toxicodendron* Mill.**

Toxico means “poison” and *dendron* means “tree,” “stick,” or “thicket.”

***Toxicodendron rydbergii* (Small ex Rydb.) Greene, Poison ivy**



Description: Poison ivy is a dioecious shrub, with woody stems that are usually up to 3 m tall and have few branches. The dark green, somewhat shiny leaves are trifoliate, with long petioles. Each leaflet may be up to 11 cm long and 10 cm wide, puberulent, and ovate to orbicular, with acute tips. The flowers are borne in thyrsoid panicles or racemes, with few flowers per inflorescence. The female flowers are small (the sepals about 1 mm long, the petals less than 3 mm long), yellowish, and bloom in May–June. The white or cream-colored fruits are glabrous subglobose drupes up to 7 mm wide.

Habitat and range: *Toxicodendron rydbergii* normally grows along streams and on moist slopes, or as an understory plant. It occurs in Beaver, Box Elder, Cache, Daguerre, Davis, Duchesne, Emery, Garfield, Grand, Juab, Kane, Millard, Slat Lake, San Juan, Uinta, Utah, Washington, Wayne,

and Weber cos. Utah counties, at 1125–2260 m. This species is undoubtedly undercollected. It is also known from Alberta to Nova Scotia and southward to Virginia, Texas, Arizona, and Nevada.

Comments: Human contact with any part of the plant will cause a rash, blisters, and severe itching in most people, but browsing animals seem unaffected. This poisonous effect is due to a yellow oil called urushiol. Smoke from burning poison ivy branches can cause severe reactions in the respiratory tract. *Rydbergii* is named after Per Axel Rydberg, a Swedish-born American botanist and the first curator of the New York Botanical Garden Herbarium in the early 20th century.



ASTERACEAE—Sunflower family (Compositae)

The sunflower family may be the largest plant family in the world. It includes herbs, shrubs, and even trees. Its tiny flowers usually occur together in dense heads (see the diagram of a sunflower in the glossary). Flowers are pollinated either by insects or wind. The fruits are achenes, dispersed by wind or animals. Members of this family are used for food crops (lettuce, artichokes, sunflower seeds, safflower, and teas), and ornamentals (daisies, marigolds, zinnias, etc.). Some members of this family, such as ragweed, sagebrush, and rabbitbrush, cause allergies in humans. In Utah, more woody plants belong to this family than any other. It includes 28 genera, 81 species, and 108 taxa (about 25% of Utah's native woody flora).

Acamptopappus (A. Gray) A. Gray

Acamptopappus means “flexible pappus.”

Acamptopappus sphaerocephalus (Harv. & A. Gray) A. Gray, Rayless goldenhead



Description: Rayless goldenhead forms rounded shrubs up to 1 m tall. The stems are white barked. The leaves are glabrous, alternate, sessile, and up to 2.8 cm long and 0.5 cm wide, spatulate to almost linear, with margins that are entire or sometimes scabrous. The yellow disk flowers occur in globose heads up to 10 mm high and appear in April–May. The involucre bracts are in 4 whorls and strongly imbricate. The fruits are subturbinate achenes, up to 4 mm long and densely villous, with a persistent pappus consisting of about 30 flattened silvery scales.

Habitat and range: Rayless goldenhead occurs in Mojave Desert shrub and Colorado Plateau shrub communities in southern Utah, at 850–1560 m, and in Arizona, California, and Nevada.

Comments: The variety of this species that is found in Utah is var. *sphaerocephalus*, which means “spherical head.”

***Ambrosia* L.**

Ambrosia is a Greek word referring to the fabled food of the gods, conferring immortality.

***Ambrosia dumosa* (A. Gray) W. W. Payne, Bursage**

Description: Bursage is a medium-sized shrub, rounded and much branched, growing up to 0.6 m tall. The branches are white and subspiny. The leaves are petiolate, mostly alternate, strigose, and up to 3 cm long and 15 mm wide. Most leaves are bipinnate and hairy on both surfaces. The inconspicuous flowers bloom in March–May, or throughout the fall and winter, if water is available. The staminate heads are displayed in erect spike-like inflorescences, with the female heads scattered among them. The involucre is spiny. The mature bur-like fruits are globose and usually gland dotted, with scattered spines.

Habitat and range: *Ambrosia dumosa* is codominant with creosote bush throughout the Mojave Desert and extends into Baja Mexico. In Utah, it occurs in Washington Co., at 670–1000 m.

Comments: Bursage is drought deciduous, not resistant to fire, and is an important pioneer plant commonly used to revegetate disturbed sites. The pollen of *Ambrosia* is a common cause of hay fever and seasonal allergies. Bursage is an important browse plant for wildlife. *Dumosa* means “bushy.”

***Ambrosia eriocentra* (A. Gray) W. W. Payne, Woolly bursage**

Description: Woolly bursage is an aromatic shrub that grows to just over 1 m tall. The branches are erect, white barked, and subspiny, with a white tomentum. The leaves are alternate, subsessile, up to 4 cm long and 2 cm wide, and bear sinuate teeth along their margins or, occasionally, are once-pinnate with marginal lobes. The male heads are clustered on the terminal spikes, while the female heads are single flowered, with flattened spines. The flowers appear April–May.



Habitat and range: Woolly bursage grows in Mojave Desert shrub communities, mostly along drainage bottoms with gravelly soils. In Utah, it only occurs in Washington Co., at 670–1250 m, as well as throughout the Mojave Desert region in Arizona, California, and Nevada.

Comments: *Ambrosia eriocentra* is a sun-loving and drought-tolerant species. *Eriocentra* means “a woolly point or center.”

Ambrosia salsola (Torr. & A. Gray) Strother & B. G. Baldwin, Burrobush



Description: Burrobush grows as a freely branching shrub, up to about 2 m tall. The sweetly scented leaves are usually simple and linear, but are sometimes divided into 1 or 2 linear segments. The leaves are up to 7 cm long, with filiform lobes that are rarely more than 1 mm wide, may have a lengthwise groove on the upper surface, and are covered with dense white hair. The flowers are borne on 2-year-old twigs, with male heads that are 5–18 flowered, intermixed with a few flowered female heads appearing in May–June. The involucre bracts are longitudinally nerved, whitish, chartaceous, and broadly rounded apically, with erose margins. The fruits have stipitate glands and lateral wings.

Habitat and range: Burrobush occurs in the Mojave Desert region of the American Southwest, including desert washes and sandy and gravelly benches of Washington Co., at 670–1220 m.

Comments: *Ambrosia salsola* is somewhat weedy and establishes quickly in disturbed areas. The foliage has a cheese-like scent when crushed. This species is a significant cause of hay fever. *Salsola* mean “salt.”

***Amphipappus* Torr. & A. Gray**

Amphipappus refers to the double pappus.

***Amphipappus fremontii* Torr. & A. Gray, Chaffbush**



Description: Chaffbush may grow up to 1 m tall, forming white spine-like branchlets that diverge at almost right angles to the main stems. The leaves are green and up to 12 mm long and 5 mm wide, oblanceolate to elliptical, with cuneate bases. The tips are acute to obtuse and apiculate. The flowering heads, borne in groups of 3–20 at the branch tips, are greenish, small, radiate, yellow flowered, and bloom in April–early June. Each head bears only a few flowers (1–2 small disk flowers and up to 6 ray flowers) above strongly imbricate bracts that are wide and rounded. The receptacles are rounded, fringed, and up to 2.5 mm wide. The achenes are hairy and bear a pappus that is formed from more or less united bristles, awns, or scales.

Habitat and range: Chaffbush grows in Mojave Desert shrub communities in Utah, at 700–950 m, and in Arizona, Nevada, and California.

Comments: Utah plants belong to *Amphipappus fremontii* var. *spinosus* (A. Nelson) Ced. Porter. *Fremontii* honors John Charles Frémont, a naturalist and early explorer of the American West, and *spinosus* means “very spiny.”

Artemisia L.

Artemisia is Greek for the goddess of forests and hills. Most members of the genus are distinctly aromatic.

***Artemisia arbuscula* Nutt., Low sagebrush**



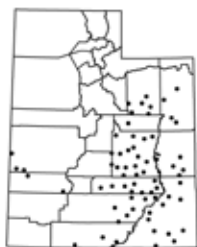
Photo by Sherel Goodrich

Description: Low sagebrush is a small evergreen shrub growing up to 0.4 m tall. The bark is brown, ultimately shredding in longitudinal fibrous strips that may be up to 3 dm long. The leaves are up to 1.6 cm long and grayish green (silvery), with appressed canescent hairs and a cuneate base. The leaf terminates in a blunt 3-lobed tip, and the lobes are usually short and triangular. The flowers are borne in small heads up to 6 mm long, arranged along spike-like inflorescence branches that are up to 2 cm wide and 30 cm long. Each head produces up to 9 perfect disk flowers that are scarious and brownish, with glabrous or glandular corollas. The small achenes are glabrous.

Habitat and range: This species occurs throughout northern and central Utah, where it is associated with pinyon-juniper, mountainbrush, and aspen-mixed conifer communities, and on open stony slopes in spruce-fir communities.

Comments: The leaves are rich in protein and are a valuable forage resource for both big game and domestic livestock. *Artemisia arbuscula* can be distinguished from *A. nova* by its canescent involucre, versus the glabrous involucre of *A. nova*. Shultz (2009) recognizes three subspecies of *A. arbuscula* occurring in Utah. *Artemisia arbuscula* subsp. *arbuscula* usually grows on rocky soils at mid to high elevations. *Artemisia arbuscula* subsp. *longiloba* (Osterh.) L. M. Shultz occurs on the clay soils of alkaline basins and valleys at lower elevations in the state, and flowers earlier than other varieties of this species (as early as the early spring snow melt). *Artemisia arbuscula* subsp. *thermopola* Beetle may be confused with *A. tripartita* because of its deeply lobed leaves, and may be an introgression or hybrid of *A. arbuscula* and *A. tripartita*. It is found on rocky soils derived from igneous rock, at elevations between 2200 and 2500 m. *Arbuscula* refers to a small shrub, *longiloba* means “long lobed,” and *thermopola* means “heat.”

***Artemisia bigelovii* A. Gray, Bigelow's sagebrush**



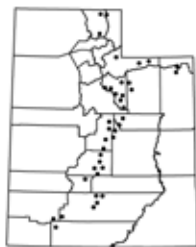
Description: Bigelow's sagebrush is a spreading, rounded, medium-sized shrub growing up to 7 dm tall. The leaves are up to 2.3 cm long and 0.7 cm wide, with entire margins and cuneate bases. The loosely canescent to tomentose hairs give the leaves a silver-green cast. The shallowly 3-lobed tip forms a rather truncate terminus with sharp-pointed lobes. The inflorescence of narrow panicles is up to 4 dm long and produce numerous small, subcylindric flowering heads up to 3.5 mm long. Each head produces up to 4 flowers that may be male, female, or perfect and bloom in early summer to late fall. The florets produce tiny glabrous achenes.

Habitat and range: Bigelow's sagebrush occurs throughout eastern, central, and southern Utah, on shallow soils over sandstone outcrops, at 975–2135 m. It is associated with pinyon-juniper and Colorado Plateau

shrub communities. It also is found in Arizona, California, Colorado, Nevada, New Mexico, and Texas.

Comments: The presence of both ray and disk flowers help distinguish *A. bigelovii* from other species of *Artemisia*. The foliage remains in place during the winter months, making the species a valuable winter forage plant. It improves soil stability and is one of the most drought tolerant of the sagebrush. *Bigelovii* is named after John Milton Bigelow, a 19th-century American naturalist and participant in expeditions to the American West.

***Artemisia cana* Pursh, Silver sagebrush**



Description: Silver sagebrush usually grows to about 1 m tall and has light-colored foliage, due to a dense appressed tomentum. The leaves up are up to 5 cm long and 0.7 cm wide, linear to narrowly elliptic, with acute bases, entire margins, and tips with occasional deep lobes. The inflorescences are spicate or narrowly paniculate and occur on the terminal branches. The heads are up to 6 mm high and equally wide, campanulate, and erect. The outer head bracts are silvery canescent, with a conspicuous green midvein. The plants flower in mid- to late summer. The achenes are glabrous.

Habitat and range: Silver sagebrush grows in sagebrush-grass and riparian communities where deep fertile soils remain moist within the rooting zone. It occurs in most Utah counties, primarily in the north-south central core of the state, at 2270–3050 m, and throughout western North America.

Comments: The Utah plants belong to *Artemisia cana* subsp. *viscidula* (Osterh.) Beetle. It is important winter forage for wildlife and domestic sheep. *Cana* means “gray” and *viscidula* means “somewhat sticky.”

Artemisia filifolia Torr., Sand sagebrush

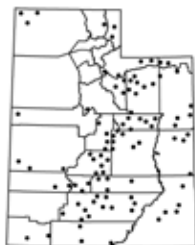
Description: Sand sagebrush forms loosely branched shrubs, pyramidal in shape and up to 1.5 m tall. The leaves are thread-like, up to 8 cm long and 1.5 mm wide, with entire margins that may be somewhat revolute. Ternate leaves sometimes occur on the lower branches. The inflorescences are terminal, up to 3 dm long, and narrowly paniculate. The flower heads are pendulous, with individual heads up to 2.2 mm long and equally wide. Each head bears up to 9 flowers, with the pistillate flowers being marginal, and blooms in August–October. The tiny achenes are glabrous.

Habitat and range: *Artemisia filifolia* is restricted to deep sandy soils or stabilized dunes in Mojave Desert and Colorado Plateau shrub communities, at 825–2290 m. It also occurs in Arizona, Colorado, South Dakota, Texas, and Mexico.

Comments: Sand sagebrush is one of the most attractive sagebrush species, with blue-gray, wand-like branches. It reduces wind erosion and stabilizes the soil. It is palatable and readily used by both wildlife and domestic livestock, but it is quickly eliminated under heavy grazing pressure. It resprouts after fire. It is a desirable shrub for xeric landscaping in well-drained soils. *Filifolia* refers to the thread-like leaves.

Artemisia frigida Willd., Fringed sagebrush

Description: Fringed sagebrush is a small shrub, rarely more than 4 dm tall, growing prostrate to ascending. The leaves are persistent, up to 1.5 cm long, 2–3 times pinnatifid, with thread-like segments, and white pilose, due to a dense cover of tomentose hairs. The inflorescences are paniculate and arise vertically from the vegetative stems. The flower heads are sessile or borne on short peduncles, with hairy involucre bracts up to 3.5 mm long and 6 mm wide. Both the marginal and the central flowers in each head are fertile. The flowers are yellow and bloom in mid- to late summer. The achenes are glabrous.



Habitat and range: Fringed sagebrush grows throughout Utah in salt desert shrub, sagebrush, pinyon-juniper, mountainbrush, ponderosa pine, and aspen-mixed conifer communities, at 900–3480 m. It is occasionally seen in alpine meadows and on rocky, barren ridges in the spruce-fir zone. It is widespread in North America and also occurs in Eurasia.

Comments: *Artemisia frigida* is a pioneer plant on disturbed sites and has landscape potential as a drought-hardy ornamental in cold climates. It is an important food source for sage grouse and other birds. *Frigida* refers to cold regions.

***Artemisia nova* A. Nelson, Black sagebrush**

Description: Black sagebrush is a small spreading shrub, growing to only 3 dm tall, but possibly twice that in diameter. The vegetative leaves are usually up to 2 cm long, have a cuneate base, and tips with 3–5 terminal lobes that are usually shallow and broadly deltoid. The leaves of the flowering stems are entire. The inflorescence is narrowly paniculate, and the individual flowering heads are up to 3.8 mm long and 3.4 mm wide. The heads are cylindrical or narrowly campanulate and usually enfolded in fewer than 12 involucre bracts. There are usually 3–8 perfect flowers per head, blooming in September–October. The achenes are glabrous and occur on a nonhairy receptacle. Some authors recognize two varieties that occur in Utah. *Artemisia nova* “var. *nova*” has leaves that are gray green and covered with glandular dots. It lacks white pubescence on the involucre bracts and has 3–8 flowers per head. *Artemisia nova* “var. *duchesnicola*” S. L. Welsh & Goodrich has leaves that are nearly white, lack glandular dots, and are densely covered with appressed canescent pubescence. The involucre bracts in this relatively rare form have a white tomentum, and there are 5 flowers per head. Shultz (2009) considers the pubescent-headed form of *A. nova* to be an abnormality, and includes both forms within *A. nova*, sens. Lat.



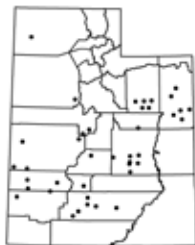
Habitat and range: *Artemisia nova* is widespread in Utah, occurring in almost all counties, at 1400–2780 m, as well as in Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, and Wyoming. The pubescent-headed *A. nova* “var. *duchesnicola*” occurs primarily in Uintah Co., at 1500–1800 m, where it grows on the sparsely vegetated red clay soils derived from the Duchesne River Formation, but the morphological anomaly occurs in other typical populations of *A. nova* as well.

Comments: Black sagebrush is one of the most valuable shrub species for the support of big game animals and domestic livestock in our region. This is one of the most palatable and nutritious species of *Artemisia* section *Tridentatae*. It is well adapted to shallow stony soils. *Nova* means “new” and *duchesnicola* refers to the Duchesne River geologic formation.

Artemisia pygmaea A. Gray, Pygmy sagebrush

Description: Pygmy sagebrush is a small briefly winter-deciduous shrub that rarely grows over 2 dm tall. The branch bases and caudex are very woody. The villous to glabrous leaves are gray green or yellowish green, pinnately to bipinnately divided into 3–10 lobes that are almost linear and acute tipped. The inflorescence is erect, spicate or narrowly paniculate, and up to 2 cm wide. The involucre bracts are in several series and imbricate, with a green midstripe and a hyaline margin. The disk flowers are 3–5, perfect, have cream-colored petals, and bloom in August–September. Ray flowers are absent. The achenes are glabrous or resinous glandular.

Habitat and range: Pygmy sagebrush occurs on calcareous, clayey soils in salt desert, Colorado Plateau shrub, and pinyon-juniper communities in western, northern, and central Utah, at 1600–2440 m. It also is found in adjacent Arizona, Colorado, Nevada, and New Mexico.



Comments: *Artemisia pygmaea* is atypical for most sagebrush, because of the bright green pinnatifid leaves. *Pygmaea* means “dwarf” or “pygmy.”

***Artemisia spiciformis* Osterh., Subalpine sagebrush**



Description: Subalpine sagebrush grows up to 0.8 m tall on favorable sites. Its crown is commonly irregularly tufted. The gray green leaves bear a dense covering of appressed, villous, canescent hair, are up to 5.7 cm long, and are narrowly cuneate at the base, being widest just below the 3–5-lobed apex. The lobes may be shallow or deeply cleft. The branches of the inflorescence are erect and up to 4 dm long. The flower heads are campanulate or cylindric, up to 6 mm long and 7 mm wide. The involucre bracts are 12 or fewer and yellowish brown or green. There are up to 10

flowers per head, all perfect, blooming in midsummer–fall. The achenes are glabrous.

Habitat and range: Subalpine sagebrush occurs throughout northern and central Utah, at 2680–3355 m. It grows along the edge of deep snow-drifts in sagebrush-grass, aspen-mixed conifer, Douglas fir, and spruce-fir communities. It also is found in California, Colorado, Idaho, Nevada, Oregon, Washington, and Wyoming.

Comments: *Artemisia spiciformis* provides palatable and important summer forage for birds and mammals. It has been considerably reduced in overgrazed areas. *Spiciformis* means “spike shaped.”

Artemisia spinescens D. C. Eaton, Budsage



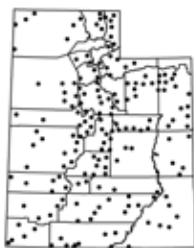
Description: Budsage is a small, spiny, aromatic subshrub that greens up very early in the spring and late winter. The plants have spreading or prostrate branches that are white, due to a dense covering of pubescence. The leaves are up to 2 cm long, with blades that are palmately twice divided into very narrow linear lobes. The inflorescence is racemose or spicate and up to 3 dm or more long. The involucre bracts are up to 3.5 mm long and 5 mm wide. The flowering heads produce 6–20 pale yellow flowers that bloom in April–June, with only the marginal flowers fertile. These produce long-hairy achenes.

Habitat and range: Budsage is widespread in the Great Basin and the Colorado Plateau. It grows on a variety of substrates that are often saline. It occurs in salt desert shrub, Colorado Plateau shrub, xeric sagebrush, and pinyon-juniper communities, at 1200–1925 m. It also is found in Arizona, California, Montana, New Mexico, and Oregon.

Comments: *Artemisia spinescens* is a valuable forage species for herbivores and often is eliminated on ranges that are heavily grazed in late winter or early spring. As a consequence, the species is uncommon on

many ranges in Utah and Nevada, where it would otherwise be a prominent plant. *Spinescens* suggests “having spines”.

***Artemisia tridentata* Nutt., Big sagebrush**



This aromatic shrub dominates our western landscapes and is characterized by gray-green leaves and inconspicuous flowers. Four subspecies occur in Utah and are described below. Where these subspecies occur as large stands, they are quite easy to distinguish; introgression and hybridization, however, can make identification of an individual plant more challenging, especially where their ranges overlap.

***Artemisia tridentata* subsp. *parishii* (A. Gray) H. M. Hall & Clements, Mojave sagebrush**



Description: Mojave sagebrush is a rounded or irregular shrub that may grow up to 3 m tall. The leaves are linear, or nearly so, mostly entire, and usually more than 5 times longer than wide. The inflorescence is large and broad, typically drooping, and arising from various levels within the shrub. The involucre is 2–4 mm long. The achenes are arachnoid villous.

Habitat and range: This subspecies prefers loose, sandy soils of valleys and foothills in warm deserts in the southern regions of the state, at 300–1800 m, and in Arizona, California, Nevada, and Baja California.

Comments: *Parishii* honors Samuel Bonsall Parish, a pioneer botanist of Southern California in the late 19th and early 20th centuries.

***Artemisia tridentata* subsp. *tridentata*, Basin sagebrush**

Description: Basin sagebrush may grow up to 3 m tall on favorable sites and forms large canopies. The leaves are 2.5 cm or more long, narrowly cuneate, about four times longer than wide, usually with 3 terminal lobes that are not deeply incised, and bear a dense covering of short, canescent, light-grayish pubescence. The terminal spike-like or narrowly paniculate inflorescences arise from different levels within the plant and extend to various heights. The flowering heads are usually up to 4 mm wide, with involucre usually 1.5–2.5 mm long. Each head bears 3–8 flowers, all perfect, with cream-colored glandular corollas, and blooms in late summer to late fall. The achenes are glabrous.

Habitat and range: This subspecies prefers deep, well-drained, fertile soils in valley bottoms and along drainages of lower montane slopes. It is often conspicuous along roadsides and fences, where moisture is more available. It occurs in all Utah counties, at 1220–2410 m. It also is found throughout the western United States and southwestern Canada.

Comments: Basin sagebrush was used by early settlers in western North America as an indicator of valuable farmland, resulting in its decreased abundance and distribution. It is rather unpalatable to wild and domestic grazers and often increases on overgrazed ranges. It does not sprout after wildfire or mechanical damage. Ecologists consider this a keystone species. Galls from the sagebrush gall midge are common on the leaves and stems. Native Americans use this plant for fuel, medicines, ceremonies, textiles, and as a disinfectant. *Tridentata* refers to the three lobes, or “teeth,” of the leaves.

***Artemisia tridentata* subsp. *vaseyana* (Rydb.) Beetle, Mountain sagebrush**

Description: Mountain sagebrush is a medium-sized shrub growing up to 1 m tall. It is rather uniformly flat topped, as a result of inflorescences rising to about the same level. The bark is dark brown and naturally shreds into fibrous strips up to 50 cm long. The leaves are up to 3.5 cm long, with a cuneate base, and are regularly 3 lobed to irregularly toothed. When crushed, the leaves have a characteristic camphor-like odor. The inflorescences are paniculate, with 3–9 flowers per head that bloom in midsummer to late fall. The achenes are glabrous.

Habitat and range: This subspecies generally is found at higher elevations than subsp. *tridentata* and often forms extensive stands. It usually grows in rocky soils on foothills and mountain slopes at higher elevations in big sagebrush-grass communities. It occurs in all Utah counties, at 1830–3050 m, as well as across the western United States.



Comments: Because the foliage persists throughout winter and has an unusually high protein content, mountain sagebrush is a valuable forage plant for wintering big game and livestock. *Vaseyana* is named after George R. Vasey, a 19th-century American botanist and grass expert.

Artemisia tridentata subsp. *wyomingensis* Beetle & A. M. Young, Wyoming sagebrush



Description: Wyoming sagebrush is another widespread taxon, much like the other subspecies of *A. tridentata*. The leaves are usually up to 2(3) cm long, broadly cuneate, and deeply to shallowly 3 lobed. The lobes are often somewhat belled out. The inflorescences are narrowly paniculate, arise from different levels within the plant, and extend to various heights. The achenes are glabrous.

Habitat and range: This subspecies occupies big sagebrush-grass communities from cold desert basins to the high plateaus of Utah, at 1525–1980 m. It also occurs in Colorado, Idaho, and Wyoming. It grows

at elevations intermediate to other subspecies of *Artemisia* and occupies sites that are somewhat drier.

Comments: Wyoming sagebrush is an important and nutritious forage plant, especially on winter ranges used by domestic livestock and/or big game animals. Due to drought and overgrazing, thousands of acres of Wyoming sagebrush are in poor condition. *Wyomingensis* means “of Wyoming.”

***Artemisia tripartita* Rydb., Three-tipped sagebrush**



Description: Three-tipped sagebrush is a handsome shrub, growing up to 1–2 m tall. The leaves are deciduous, up to 4 cm long, and most terminate in 3 deeply cleft linear lobes (some leaves of the flowering stems may not be lobed). The leaf margins are entire, and the surfaces are gray green and canescent. The inflorescence is panicleate and up to 3.5 dm long. Individual flower heads have greenish involucre bracts up to 4 mm long. Each head may be 4 mm wide and have up to 8 perfect flowers that bloom in midsummer to late fall. The achenes are glabrous.

Habitat and range: *Artemisia tripartita* grows on valley floors and foothill slopes in northeastern Utah, and has been confirmed from only one population in Rich Co., at 1525–1830 m. It also occurs throughout much of western North America in big sagebrush and mountainbrush communities. It becomes a community dominant on the Snake River Plains of eastern Idaho.

Comments: The subspecies that occurs in Utah is ssp. *tripartita*. *Tripartita* means “three parted.”

***Baccharis* L.**

Baccharis is named after Bacchus, the Greek god of wine, and refers to plants with aromatic roots yielding oil.

Baccharis salicifolia (Ruiz & Pav.) Pers., Seepwillow

Description: Seepwillow is a dioecious, spreading to erect shrub that grows up to 3 m tall. The stems are green to tan when young, becoming brownish by the end of the first year. The leaves are deciduous, gland dotted, and elliptic to narrowly lanceolate, up to 15 cm long and

1.8 cm wide, with a short petiole. The leaf bases are cuneate, the tips are acute to acuminate, and the margins are evenly serrate to entire. The leaves are present at flowering. The flowering heads are many, borne in terminal cymose panicles. Individual flower heads may be either male or female, with both types of heads about equal in size. The involucral bracts are up to 4.5 mm long and 5.5 mm wide, borne in several series. Each bract is chartaceous, with a central greenish nerve. The

margins of the bracts are scarious and nonglutinous. The corollas are up to 3 mm long, with the pistillate pappus up to 4.5 mm long. Flowering occurs in March–October. The achenes are strongly 5 ribbed and glabrous.

Habitat and range: In Utah, seepwillow grows along the Virgin and Colorado rivers and their tributaries, at 670–1350 m. It is confined to canyon bottoms, where water accumulates and soil moisture is replenished by seepage from the stream or wash. It occurs from Texas to California and Colorado to Nevada. It is also found in Mexico and Central and South America.

Comments: *Baccharis salicifolia* appears to be little used by big game and domestic livestock. *Salicifolia* refers to the willow-like leaves.

Baccharis salicina Torr. & A. Gray, Willow baccharis

Description: Willow baccharis is a dioecious shrub that may grow up to 3 m tall, with stems that vary from green to olive when young and are brownish when older. The stems are usually erect and little branched, with surfaces that are usually glutinous. The leaves are numerous, present at flowering, up to 8.5 cm long and less than 2 cm wide, and arise from a slender petiole. The tips are acute to obtuse or rounded. The leaf blades are gland dotted, oblong, elliptic to oblanceolate, the margins entire or irregularly 1–3 toothed. Broader leaves are 3-nerved. The flowering heads are abundant and displayed in pyramidal panicles. The staminate heads have involucre up to 6 mm high and 5 mm wide. The involucre of the female heads are up to 9 mm long and 7 mm wide, with scarious and often resinous bracts borne in several series. The pistillate corollas are up to 6 mm long and bloom in May–November. The pappus is 8–12 mm long. The achenes are glabrous, with 8–10 ribs.



Habitat and range: Willow baccharis grows along stream and ditch banks in most of southern Utah, at 825–1350 m. It is also known from Arizona, California, and Texas.

Comments: *Salicina* refers to the willow-like leaves.

***Baccharis sergiloides* A. Gray, Desert baccharis**



Description: Desert baccharis is a small dioecious shrub, with erect broom-like branches that may be up to 1.2 m tall. The stems are green or brownish, glutinous, and have distinct longitudinal ridges. The leaves are up to 3 cm long and 1 cm wide, spatulate to obovate and somewhat thick, and most wither by flowering. The margins are entire, or have 1–4 irregular teeth. The inflorescences are pyramidal, with heads up to 3.5 mm long and equally wide. The involucre are straw colored and campanulate. Individual bracts are thickened and have brownish centers. Flowering occurs in May–October. The pappus is up to 3 mm long. The achenes are glabrous and 10 ribbed.

Habitat and range: Desert baccharis grows on stream edges and sandbars and around seeps. In Utah, it is found only in Washington Co., at 670–1340 m. It also occurs in Arizona and California.

Comments: *Sergiloides* may come from the French word *serge*, meaning “silken stuff,” referring to the silky thistle-like heads of the tiny fruits.

Baccharis wrightii A. Gray, Wright's baccharis



Description: Wright's baccharis is a dioecious upland subshrub, woody only at the base and thus differing from other members of the genus in Utah. It grows up to 7 dm tall on favorable sites. The plant branches weakly from its base and has angled stems. The leaves are sessile, nonglandular, and up to 3 cm long and 2–3 mm wide, linear to narrowly lanceolate, the margins entire to serrulate, with a single strong midnerve. The inflorescences appear in May–June and bear

large, single, hemispheric flowering heads up to 12 mm tall. The involucral bracts are green or brown veined. The corollas are filiform and up to 4.7 mm long. The achenes bear a pinkish-brown pappus that is almost as long as the corolla, with each bristle bearing ascending barbs. The achenes are up to 5 mm long, glandular, and strongly 5–10 ribbed.

Habitat and range: Wright's baccharis grows in the Colorado Plateau shrub communities in San Juan Co., at 1220–1620 m, and in similar vegetation types from Arizona to Oklahoma, Texas, and Mexico.

Comments: Pollen from *Baccharis wrightii* may cause severe allergies. *Wrightii* honors Charles (Carlos) Wright, a 19th-century American botanist and plant collector.

***Bebbia* Greene**

Bebbia is named after Michael Schuck Bebb, a 19th-century American botanist specializing in willows.

Bebbia juncea (Benth.) Greene, Sweetbush

Description: Sweetbush is a rounded shrub up to 1 m tall, with branches that are often rough-hairy. The leaves are sparse, opposite below and alternate above, and usually up to 7 cm long and 7 mm wide, linear to lanceolate, with entire margins that are sometimes lobed. The flower heads are up to 8 mm long, with involucral bracts that are harshly hairy and ovate to lanceolate. The inner bracts may be reddish. The flowers are yellow, all discoid and perfect, and bloom throughout most of the year. The achenes are triangular and compressed, with 2 sharp angles, one being more blunt than the other.

Habitat and range: Sweetbush grows on gravelly wash bottoms and stony stream terraces in Washington Co., at 850–1100 m, and in similar habitats from California to Texas and Mexico.





Comments: Utah plants are assigned to *Bebbia juncea* var. *aspera* Greene. The flowers are a delicacy to chuckwallas and a favorite food of the desert tortoise. Sweetbush is drought tolerant and prefers full to moderate sun. *Juncea* means “rush-like” and *aspera* means “rough.”

***Brickellia* Elliott**

Brickellia is named after John Brickell, an 18th-century physician and botanist from Savannah, Georgia.

***Brickellia atractyloides* A. Gray, Spiny brickellbush**



Description: Spiny brickellbush is a small shrub that rarely is more than 0.5 m tall. First-year twigs are densely short-hirtellous and often minutely glandular. The leaves are alternate, or sometimes opposite, up to 5 cm long and 2.5 cm wide, commonly ovate or deltoid or, less commonly, lanceolate, shiny green, and veiny, with margins that are entire or few

toothed. The leaf bases are subtruncate to rounded, and the petioles are up to 3 mm long. The inflorescences consist of heads atop bare peduncles borne at the twig tips. The involucral bracts are up to 13 mm long, with heads that are up to 1.5 cm wide and produce 40–90 flowers. The corollas are greenish to slightly bluish and appear in April–May. The achenes are black, ribbed, and up to 5 mm long.

Habitat and range: Spiny brickellbush grows in rock crevices and ridges in Mojave Desert shrub and Colorado Plateau shrub communities in the southernmost counties of Utah, at 820–1130 m. It also occurs in Arizona, California, Colorado, Nevada, and Mexico.

Comments: Utah plants belong to *Brickellia atractyloides* var. *atractyloides*. *Atractyloides* refers to a thistle-like plant.

***Brickellia californica* (Torr. & A. Gray) A. Gray, California brickellbush**



Description: California brickellbush is a spineless shrub that may grow up to 1 m tall and is woody only at the base. The leaves are alternate and up to 5.2 cm long and 4.5 cm wide, ovate to orbicular. The leaf bases are cordate or truncate, the tips are obtuse to rounded, and the margins are crenate to serrate. The veins are distinct, and the leaf surfaces are scabrous and glandular. The inflorescences are terminal panicles, with clustered flowering heads that bloom in July–September. The involucre are up to 8 mm tall and 7 mm wide, with bracts of variable height. The inner bracts are glabrate and tinted reddish or purple. The flowers are usually 8–12 per head and pale yellow-green. The achenes are up to 3.5 mm long, straw colored, and glabrous.

Habitat and range: California brickellbush occurs in pinyon-juniper and mountainbrush communities throughout most of Utah, at 825–2135 m. It is also known from much of the southwestern United States and Mexico.

Comments: *Californica* means “of California.”

***Brickellia longifolia* S. Watson, Longleaf brickellbush**

Description: Longleaf brickellbush is a subshrub that may grow up to 1.5 m tall. The stems are erect, with white or tan bark, and bear sessile alternate leaves. The leaves may be glabrous and resinous, have distinct veins, and are up to 13 cm long and 8 mm wide, lanceolate and linear to elliptical, with tapering bases and attenuate tips. The heads are borne in panicle inflorescences. The involucre is up to 6 mm long and 4 mm wide, with outer bracts that are ovate and acute. The inner bracts are narrow and glabrous. The heads bear up to 5 flowers and bloom in August–November. The achenes are up to 2.4 mm long, glabrous and brown at maturity.

Habitat and range: This species grows in canyon bottoms, desert washes, and hanging gardens. It occurs throughout central and southern Utah, at 750–2290 m. It is also known from Arizona, Colorado, and Nevada.

Comments: Utah plants belong to *Brickellia longifolia* var. *longifolia*. *Longifolia* refers to the long leaves.

***Brickellia microphylla* (Nutt.) A. Gray, Littleleaf brickellbush**

Description: Littleleaf brickellbush grows up to 0.7 m tall. The stems are very branching, white to tan, gland dotted, and pubescent. The leaves are alternate, with petioles that are short to nearly lacking. The leaves are ovate to suborbicular, mostly less than 18 mm long and 12 mm wide, and usually 3-nerved. The leaf surfaces are glandular hispidulous. The margins are entire or toothed. The flowering heads are solitary, or a few at the tips of the branches, and arranged in leafy panicle inflorescences that bloom in July–October. The heads are up to 11 mm long and 9 mm wide. The outer bracts are ovate, with thick glandular tips. The inner bracts lack glands and are 3 lobed or 3 veined. The achenes are glabrous to hirtellous,

blackish, and up to 4.3 mm long. Two varieties are recognized. *Brickellia microphylla* var. *microphylla* has 15–28 florets per head and stems and peduncles that are viscid to glandular villous. *Brickellia microphylla* var. *scabra* A. Gray has flowering heads with 8–13 florets per head.



Habitat and range: Littleleaf brickellbush is found on dry rocky walls, sand dunes, and washes in sagebrush, salt desert shrub, mountainbrush, and pinyon-juniper communities. *Brickellia microphylla* var. *microphylla* grows in the western and northern portions Utah, as well as in most of the western United States and south to Mexico. *Brickellia microphylla* var. *scabra* is more common in southeastern Utah, at 885–2170 m.

Comments: The two varieties of *Brickellia microphylla* grade into each other where their ranges overlap. *Microphylla* means “small leaved” and *scabra* means “rough.”

***Brickellia oblongifolia* Nutt., Mojave brickellbush**

Description: Mojave brickellbush is an aromatic subshrub that grows up to 5.5 dm tall and is woody only at the base. The leaves are alternate, sessile, and up to 4 cm long and 1 cm wide, elliptic or lance-oblong, with entire or, rarely, serrate margins. The leaf surface is glandular to hispidulous. The veins are indistinct, and the leaf tips are obtuse or attenuate. The heads arise singly at the ends of the branches or in corymbose inflorescences. The heads produce up to 40 flowers that are pink, purple, or brown and appear in June–August. The involucre bracts may be up to 1.5 cm long and form heads up to 2.2 cm wide. The bracts are glandular or glandular puberulent. The achenes are up to 6 mm long and blackish, with short hairs.



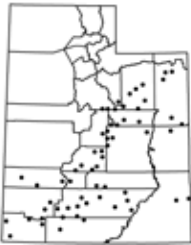
Habitat and range: Mojave brickellbush occurs throughout Utah, at 1280–2500 m, and in western North America.

Comments: Utah plants belong to *Brickellia oblongifolia* var. *linifolia* (D. C. Eaton) B. L. Rob. *Oblongifolia* refers to the oblong leaves and *linifolia* suggests flax-like leaves.

***Chrysothamnus* Nutt.**

Chrysothamnus is Greek for “golden shrub.”

***Chrysothamnus depressus* Nutt., Dwarf rabbitbrush**



Description: Dwarf rabbitbrush is a suffrutescent low-growing subshrub up to 3 dm tall, with erect branches that are white and puberulent or glandular. The leaves are lanceolate to spatulate, up to 2 cm long and 5 mm wide. The leaf tips are rounded to apiculate. The flowering heads appear at the stem tips, with involucre that are up to 13 mm long and 7 mm wide. The

flowers are yellow, up to 9 mm long, and bloom in summer–fall. The bracts appear in 4 or 5 strong vertical ranks and are lanceolate attenuate, with soft awl-shaped tips. The outer bracts are usually herbaceous, while the inner bracts have wide hyaline edges. The achenes are glabrous to somewhat stipitate glandular and up to 7 mm long, with a pappus that is beige to brownish.

Habitat and range: Dwarf rabbitbrush grows in rocky crevices and dry canyons in salt desert shrub, pinyon-juniper, mountainbrush, ponderosa pine, and spruce-fir communities throughout Utah, at 1550–2900 m. It is also known from Arizona, California, Colorado, Nevada, and New Mexico.

Comments: *Depressus* suggests low growing.

Chrysothamnus greenei (A. Gray) Greene, **Greene's rabbitbrush**



Description: Greene's rabbitbrush is a small suffrutescent shrub, 2–5 dm tall, with stems that are white and glabrous. The leaves are up to 3.5 cm long and 1.2 mm wide, flat, and glabrous or scabrous ciliate. The heads are numerous and borne in corymbose inflorescences. The corollas are yellow, up to 4.8 mm long, and bloom in July–September. The involucre is up to 7 mm long and 4 mm wide, with bracts that are obscurely ranked. The outer bracts are herbaceous and acuminate cuspidate, while the inner bracts are narrow and glabrous or somewhat tomentose. The achenes are up to 4 mm long and long pilose.

Habitat and range: *Chrysothamnus greenei* occurs in dry open places in xeric sagebrush, salt desert shrub, and pinyon-juniper communities throughout Utah, at 1280–2745 m. It is also known from Arizona, California, Colorado, Nevada, New Mexico, and Wyoming.

Comments: Greene's rabbitbrush may form intermediates with *Chrysothamnus viscidiflorus*. *Greenei* is named after Edward Lee Greene, a mid-19th- to early 20th-century American botanist, particularly of the America West.

Chrysothamnus scopulorum (M. E. Jones) Urbatsch, R. P. Roberts & Neubig, Mountain goldenweed

Description: Mountain goldenweed is a subshrub that grows up to 10 dm tall on favorable sites. The stems are green or straw colored when young, becoming white with age. The leaves are lanceolate to

oblong, up to 7.8 cm long and 8 mm wide, the margins entire, 3-nerved, and with glabrous to hirtellous surfaces. The leaf tips are attenuate and spinulose. The flowering heads are few to many, borne in subcompact corymbose cymes. The heads lack ray flowers. There are up to 20 yellow or yellowish-orange disk flowers that appear in summer–fall. The involucre are narrowly campanulate, up to 9.5 mm long and 5.5 mm wide. The bracts are arranged in 5–6 series and are oblong, chartaceous, and yellowish, sometimes with greenish or brown-

ish tips. The bracts are nonresinous and without hairs, with rounded to acute tips. The achenes are cylindric, and the pappus has tan hairs.

Habitat and range: *Chrysothamnus scopulorum* occurs in pinyon-juniper, mountainbrush, and ponderosa pine communities, usually on sandstone-derived soils. It is widespread in southern Utah, at 1370–1950 m, and is also known from Arizona.

Comments: *Scopulorum* means “of the rocks.”

Chrysothamnus stylosus (Eastw.) Urbatsch, R. P. Roberts & Neubig, Resinbush



Description: Resinbush grows up to 1.2 m tall, with young stems that are white, tan, or grayish and glutinous-resinous. The alternate leaves are up to 6 cm long and 1 cm wide, narrowly lanceolate or elliptic, with entire margins, attenuate, and somewhat deflexed, with spinose tips. The heads are borne singly or with few to many in a corymbose inflorescence. The involucre are up to 12 mm long and often glutinous. The flowers are yellow, up to 7 mm long, and appear in summer–fall. The branches of the style extend beyond the corolla. The achenes are up to 5 mm long, compressed, and glutinous, with spreading hairs.

Habitat and range: Resinbush grows in Colorado Plateau shrub and pinyon-juniper communities and other sandy habitats across southern Utah, at 1125–1620 m, and in Arizona.

Comments: *Chrysothamnus stylosus* is an endemic species of the Colorado Plateau. *Stylosus* refers to the prominent styles.

Chrysothamnus vaseyi (A. Gray) Greene, Vasey's rabbitbrush

Description: Vasey's rabbitbrush is a small shrub, up to 3 dm tall, with twigs that are more or less viscid and initially green, becoming whitish gray with age. The alternate leaves are up to 3.7 cm long and 3 mm wide, linear to oblong or oblanceolate, flat, mucronate, and glabrous or sparsely glandular. The heads are numerous, in terminal compact cymes. The corollas are yellow, up to 7 mm long, and bloom in July–September. The involucral bracts are acute to obtuse. The bracts are mostly awned, usually herbaceous, thickened near the apex, up to 7.5 mm long and 6 mm wide, and glandular, with margins that are hyaline and fimbriate. The achenes lack hairs, are reddish brown, and are up to 4 mm long.



Habitat and range: *Chrysothamnus vaseyi* is found in open areas and meadows in sagebrush, pinyon-juniper, mountainbrush, and ponderosa pine communities in most Utah counties, at 1675–2900 m, and in similar habitat in Colorado, Nevada, New Mexico, and Wyoming.

Comments: *Vaseyi* honors George R. Vasey, a 19th-century American botanist and grass expert.

***Chrysothamnus viscidiflorus* (Hook.) Nutt., Viscid rabbitbrush**

Viscid rabbitbrush is a branching shrub, usually up to 1 m tall. The bark is whitish tan and becomes flaky and fibrous when older. The stems are often resinous. The sessile leaves are linear to lanceolate, up to 7.5 cm long and 1 cm wide, and often twisted. The flowering heads extend beyond the distal leaves in dense, rounded, cyme-like arrays. The disk flowers bloom in July–September. The style branches are usually exerted beyond the lobes of the disk flowers. Ray flowers are lacking. The involucre is up to 7 mm long and 2.5 mm wide. Four varieties or subspecies occur in Utah, but they may be difficult to distinguish in the field.

***Chrysothamnus viscidiflorus* subsp. *axillaris* (D. D. Keck) L. C. Anderson, Inyo rabbitbrush**

Description: The leaves of Inyo rabbitbrush are hairy above, not twisted, and up to 1 mm wide, with ciliate margins. The stems are glabrous. The involucre is more or less turbinate, with 3–4 flowers per head.

Habitat and Range: This subspecies occupies desert slopes in granitic sand in Utah, California, Arizona, Colorado, and Nevada.

Comments: *Axillaris* refers to the leaf axils.

***Chrysothamnus viscidiflorus* var. *lanceolatus* (Nutt.) Greene, Lanceleaf rabbitbrush**

Description: The stems of lanceleaf rabbitbrush are greenish and hirtellous to puberulent. The leaves are hirsute to hirtellous above and glabrous below, 2–6 mm wide, and linear to lanceolate, usually not twisted. The involucre is turbinate.

Habitat and Range: This subspecies occurs in pinyon-juniper, spruce-fir, lodgepole pine, alpine meadow, and sagebrush communities in all Utah counties, at 1375–3200 m, and throughout western North America.

Comments: *Lanceolatus* means “lance-like leaves.”

***Chrysothamnus viscidiflorus* var. *puberulus* (D. C. Eaton) Jeps., Hairy low rabbitbrush**

Description: The stems and leaves of hairy low rabbitbrush are densely puberulent, narrowly linear, and often twisted. The involucre is turbinate.

Habitat and Range: This variety occurs on subalpine slopes in Utah, at 1460–2900 m. It is also found in Arizona, California, Idaho, Nevada, and Oregon.

Comments: *Puberulus* means “somewhat pubescent.”

***Chrysothamnus viscidiflorus* var. *viscidiflorus*, Sticky-flowered low rabbitbrush**



Description: The stems of sticky-flowered low rabbitbrush are usually glabrous. The leaves are linear to lanceolate, up to 1 cm wide, and usually twisted. The involucre is narrowly cylindric. There are 4–14 flowers per head.

Habitat and Range: This variety occurs at 900–4000 m in the Intermountain West.

Comments: Our treatment of this variety includes *C. viscidiflorus* var. *stenophyllus* (A. Gray) H. M. Hall. *Viscidiflorus* means “sticky flowers” and *stenophyllus* means “narrow leaved.”

***Encelia* Adans.**

Encelia is named after Christoph Entzelt, a 16th-century German naturalist who Latinized his surname to Encelius.

***Encelia farinosa* A. Gray ex Torr., Brittlebush**

Description: Brittlebush is a rounded shrub up to 1 m tall. It has white, aromatic, leaves that cluster at the ends of the stems. The alternate leaves are silvery tomentose, up to 8 cm long, and ovate, with margins that are entire or toothed. The peduncles are glabrous, with cymose heads producing showy orange-yellow flowers up to 1.5 cm wide. There are 11–21 ray flowers, blooming in February–May and August–September. The involucre is up to 7 mm long, gland dotted, and villous. The achenes are narrowly obovate.

Habitat and range: Brittlebush occurs in Mojave Desert shrub communities in Washington Co., at 850–1280 m. It is also found in Arizona, California, Nevada, and Mexico.

Comments: The plants establish rapidly following disturbance. *Encelia farinosa* does best in full sun, with good drainage, and is a popular ornamental. The leaves reflect up to 70% of the solar radiation. It is an important source of nectar and pollen for bees. *Farinosa* means “mealy or powdery.”

Encelia resinifera C. Clark, Resin brittlebush



Description: Resin brittlebush grows to just over 1 m tall. The leaves are green, up to 2.5 cm long and 2 cm wide, lanceolate to ovate, with acute tips, gland-dotted above, and hispid, with pustulose hairs. The flowering peduncles are scabrous to glabrate, with heads that are borne singly at the branch tips. The flowering disk is up to 2 cm wide. The flowers are yellow and appear in May–September if precipitation is adequate. The ray flowers are 5–13 per head. The involucre is up to 10 mm long, strigose or glandular, and gradually attenuate. The achenes are 5–8 mm long.

Habitat and range: *Encelia resinifera* grows in the Colorado River Basin, on slickrock or rocky soils, in Colorado Plateau shrub communities. It occurs in the southern tier of counties in Utah, at 1130–1830 m, and is also known from Arizona.

Comments: *Resinifera* means “with resin.”

Encelia virginensis A. Nelson, Virgin brittlebush

Description: Virgin brittlebush is an aromatic rounded shrub that grows up to 1.5 m tall. The leaves are ovate to deltoid, 1–2.5 cm long, with acute or obtuse tips, usually gray green and canescent, and occasionally strigose. The heads are borne singly and usually have 11–21 ray flowers that bloom in April–June, as well as in December if water is available. The involucre bracts are abruptly caudate acuminate and 9–13 mm long. The achenes are 5–8 mm long.

Habitat and range: Virgin brittlebush occurs in Mojave Desert communities on gravelly soils in Washington Co., at 760–1325 m. It is also known from Arizona, California, Nevada, and New Mexico.



Comments: *Encelia virginensis* is a beautiful shrub, especially in bloom, and it is common in arid landscapes. *Virginensis* refers to the Virgin River region.

***Ericameria* Nutt.**

Ericameria is Greek for “heath-like leaves.”

***Ericameria albida* (M. E. Jones ex A. Gray) L. C. Anderson, Whiteflower rabbitbrush**



Description: Whiteflower rabbitbrush may grow up to 1 m tall. The stems are erect, largely parallel to each other, white, glabrous, resinous, and aromatic. The leaves are up to 3.5 cm long and 1 mm wide, terete, with mucronate tips, and bear glandular dots. The leaves are often crowded on the stems, with axillary clusters of leaflets. The flowering heads occur in short broad inflorescences. The disk flowers are white, up to 7.5 mm long,

and bloom in August–September. Ray flowers are absent. The involucre are up to 9 mm high and 7 mm wide, with bracts that are 4–5-ranked. The outer bracts are lance-ovate, thick based, and attenuate. The inner bracts are oblong, with acute tips and hyaline margins. The achenes are 5 ribbed, up to 4.5 mm long, and pilose or glandular. The pappus is conspicuous and whitish.

Habitat and range: Whiteflower rabbitbrush grows in salt desert shrub communities in the Great Basin, at 1450–1650 m. It occurs in California and Nevada.

Comments: The white appearance of the stems, disk flowers, and pappus of *Ericameria albida* fit well with the common name. *Albida* means “white.”

Ericameria cervina (S. Watson) Rydb., Deer goldenbush



Description: Deer goldenbush is a small shrub that is rarely more than 4 dm tall. It is much branched, with stems that are straw colored or grayish. The leaves are elliptic to oblanceolate, up to 18 mm long and 6 mm wide, with entire or undulate margins. The leaf bases are attenuate, and the tips are cuspidate. The leaf surfaces are glabrous or resinous. The heads appear in cymose inflorescences that bloom in late summer through fall. The ray flowers are up to 7 in number, yellow, and up to 4 mm long and 1 mm wide. The disk flowers are up to 11 in number and have glabrous or puberulent tubes. The involucre of individual heads are up to 7.5 mm long and 8 mm wide, with imbricate bracts. The outer bracts are green and narrowly acuminate, with narrow spreading tips. The inner bracts are chartaceous, narrow, acute, and glabrous or resinous. The achenes bear a straw-colored pappus.

Habitat and range: *Ericameria cervina* occurs on limestone and granitic soils and in crevices or on talus in xeric sagebrush, pinyon-juniper, mountainbrush, bristlecone pine, and Douglas fir communities in western Utah, at 1670–2685 m, and in nearby Arizona and Nevada.

Comments: *Cervina* means “tawny,” the color of a deer or antelope.

***Ericameria crispa* (L. C. Anderson) G. L. Nesom, Crisped goldenbush**



Description: Crisped goldenbush is a small shrub that grows up to 5 dm tall on favorable sites. The plants are much branched, with stems that are green when young and stipitate glandular. The leaves are short petioled and up to 3 cm long and 8 mm wide, with undulate margins. The leaf surfaces are glutinous, with sessile glands. The inflorescence is cymose, and individual flowers are borne in loose panicles. The involucre is campanulate, up to 16 mm long and 12 mm wide. The bracts of individual heads are finely glandular and imbricate, in several series, with the outermost bracts leaf-like. The heads lack ray flowers and bear 14–24 disk flowers that are pale yellow and bloom in late summer–fall. The pappus is tawny, and the achenes are up to 8.5 mm long and sparsely hairy.

Habitat and range: *Ericameria crispa* occurs in ponderosa pine, spruce-fir, and southern mountainbrush communities in the mountains of west-central and southwestern Utah, at 2470–3050 m.

Comments: *Crispa* refers to the curled, uneven, or wrinkled leaves. Crisped goldenbush is of conservation concern.

***Ericameria discoidea* (Nutt.) G. L. Nesom, Whitestem goldenbush**



Description: Whitestem goldenbush is a small shrub that rarely grows taller than 5 dm. The young stems are white tomentose. The leaves are usually stipitate glandular, resinous, and up to 32 mm long and 7 mm wide, linear, oblong, or oblanceolate, with undulate crisped margins and

mucronate tips. The campanulate heads may be solitary, or in clusters, lack ray flowers, and bear as many as 25 disk flowers that bloom in late summer–fall. The involucre bracts are up to 13 mm high and 12 mm wide, with a few herbaceous outer bracts. The inner bracts are chartaceous, lance-linear, glandular, and scabrous. The achenes are villous, yellow, and bear a tawny pappus.

Habitat and range: *Ericameria discoidea* occurs in northern and central Utah counties in Douglas fir, aspen mixed-conifer, spruce-fir, and alpine communities, at 2135–3510 m. It is also known from California, Colorado, Idaho, Montana, Oregon, Nevada, and Wyoming.

Comments: *Discoidea* refers to being rayless, that is, having disk flowers only.

Ericameria laricifolia (A. Gray) Shinnery, Larchleaf goldenbush



Description: Larchleaf goldenbush may grow up to 8 dm tall, with stems that are resinous and greenish yellow when young, becoming gray. The leaves are up to 18 mm long and 1–2 mm wide, linear to narrowly oblanceolate, subterete, and somewhat thick. The midvein is not evident. The stems and leaves are gland dotted and resinous. The involucre bracts are up to 5 mm long and 6 mm wide, glabrous, and rather translucent. The bract margins may be finely ciliate. Each head has up to 6 yellow ray flowers and up to 16 disk flowers that are sometimes glabrous or minutely hairy, blooming in September–October. The achenes are tan to brown, villous, with minute white hairs, and topped by a tawny pappus.

Habitat and range: *Ericameria laricifolia* occurs in Mojave Desert shrub communities in seepage areas, dry streambeds, rocky walls, and open rocky slopes. In Utah, it grows only in Washington Co., at 820–2410 m. It is also found in Arizona, California, Nevada, New Mexico, Texas, and Mexico.

Comments: *Laricifolia* refers to the larch-like leaves.

***Ericameria lignumviridis* (S. L. Welsh) G. L. Nesom, Greenwood's goldenbush**

Description: Greenwood's goldenbush is a small shrub up to 3 dm tall, with branchlets that are smooth and resinous. The leaves are green and spatulate-oblongate, up to 3 cm long and 3 mm wide, with entire margins. The leaf tips are spinose, and the leaf surface is resinous. The heads, borne 1–3 per branch tip, are obconic, resinous, and bloom in late summer–fall. The flowering heads are yellow, with up to 8 rays that are up to 4 mm long, and usually with fewer than 12 disk flowers per head. The involucre is up to 15 mm high and 8 mm wide. None of the bracts are foliose, but they may have herbaceous tips. The achenes are up to 5 mm long, densely hairy, and bear a tawny pappus.

Habitat and range: *Ericameria lignumviridis* is a narrowly distributed endemic, found only in Sevier Co., where it grows with willows and other riparian species, about 1890 m.

Comments: *Lignum* means “wood” and *viridis* means “green.” Greenwood goldenbush is of conservation concern.

***Ericameria linearifolia* (DC.) Urbatsch & Wussow, Narrowleaf goldenbush**

Description: Narrowleaf goldenbush is a beautiful shrub, growing up to 1 m tall, with branches that are resinous and yellowish, becoming gray in older stems. The leaves are filiform, linear, or narrowly oblanceolate, up to 5 cm long and 2.5 mm wide, somewhat thick, resinous, and gland dotted, with an evident midvein. The flowering heads are 1 to few per stem. The involucre is hemispheric, 8–14 mm long and 8–18 mm wide. The bracts appear in 2 or 3 series, are lance-linear, apically acute, with herbaceous tips, and may be finely glandular. The flowering heads may have up to 18 yellow ray flowers up to 15 mm long, and numerous disk

flowers, blooming in spring–early summer. The achenes are 2 ribbed, very hairy, and white.

Habitat and range: In Utah, narrowleaf goldenbush occurs only in Washington Co., at 700–1375 m, where it grows in Mojave Desert shrub and pinyon-juniper communities. Elsewhere, it grows in Arizona, California, Nevada, New Mexico, Texas, and Baja, Mexico.

Comments: *Ericameria linearifolia* is a very attractive shrub and should be featured in xeric landscapes. *Linearifolia* means “linear leaves.”

***Ericameria nana* Nutt., Dwarf goldenbush**

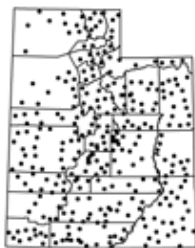


Description: Dwarf goldenbush is a small shrub, up to 3 dm tall, with compact young branches that are resinous and yellowish, while older branches become grayish. The resinous leaves are up to 18 mm long and 2 mm wide, linear, elliptic, or narrowly oblanceolate, with acute tips and entire margins. The flowering heads are few to several, appearing in compact cymes and flowering in summer–fall. The heads bear up to 7 yellow ray flowers up to 3 mm long, and up to 10 disk flowers. The involucre are up to 8.5 mm long and 5 mm wide, with bracts in 4 or 5 series. The outer bracts are usually green, while the inner ones are chartaceous, with transparent glabrous margins. The achenes may be villous or glabrous and bear a tawny pappus.

Habitat and range: *Ericameria nana* occurs in most counties in western and central Utah, in xeric sagebrush, big sagebrush-grass, and pinyon-juniper communities, at 1310–2820 m. It also grows in Idaho, Nevada, California, Oregon, and Montana.

Comments: *Nana* means “dwarf.”

***Ericameria nauseosa* (Pall. ex Pursh) G. L. Nesom & G. I. Baird, Rabbitbrush**



Description: Rabbitbrush is a large complex, distributed throughout the western part of North America. *Ericameria nauseosa* includes some varieties that are common and widespread and others that are rare and occupy very restricted habitats. Many varieties are transitional and difficult to distinguish, while some form hybrids with other species of *Ericameria*, making field identification challenging. Generally, this species has stems covered to some degree with a compact tomentum. The involucral bracts occur in 3–5 series that are often strongly unequal and mostly chartaceous. All varieties lack ray flowers and usually have 5 disk flowers that bloom in August–October. In an effort to make field identification more successful and satisfying, we provide some general distinctions among the varieties and describe those most commonly recognized. The taxonomy of this group is an ongoing and active area of research.

Comments: Many varieties of rabbitbrush are used in arid landscaping, because of their beautiful yellow flowers in the fall. They attract many butterflies and other insects. Rabbitbrush is eaten by rabbits and browsed by deer, elk, and pronghorn. It has been used as a source of yellow and green dyes. *Nauseosa* means “nauseous,” or causing nausea.

Key to Varieties of *Ericameria nauseosa*

We have separated these rabbitbrush varieties into four categories that may help to distinguish them: rabbitbrush over 1 m tall and widespread (5 varieties); rabbitbrush less than 0.5 m tall and occurring only in Utah (3 varieties); rabbitbrush that usually lack leaves at flowering time (3 varieties); and rabbitbrush that grow mostly in sandy soils (3 varieties).

Group A. Rabbitbrush varieties that are usually more than 0.5 m tall; the stems leafy at flowering; the corolla lobes glabrous; the involucre usually less than 10 mm long; not restricted to sandy soils; and widespread in the western United States.

- 1a Leaves tomentulose at maturity; stems pubescent, white, or grayish white and somewhat loose; involucre tomentulose **2**
- 1b Leaves becoming glabrous at maturity; stem pubescence usually yellowish green and compact, often glutinous; involucre glabrous and often glutinous **4**
- 2a Leaves usually 3–6 mm wide, 3–5-nerved; involucre bracts usually obtuse; often in mesic habitats (willowleaf rabbitbrush) **var. *salicifolia***
- 2b Leaves usually 1–3 mm wide; involucre bracts usually acute **3**
- 3a Leaves filiform to linear, 10–35 mm long and 1–2 mm wide, whitish; corolla extending well beyond the pappus; corolla lobes usually less than 1 mm long (white rabbitbrush) **var. *hololeucus***
- 3b Leaves linear to linear oblanceolate, 3–7 cm long and usually 0.5–2 cm wide, dark green to grayish white; corolla equal to or slightly longer than the pappus; corolla lobes usually more than 1 mm long (Whitestem rabbitbrush) **var. *speciosus***
- 4a Leaves 1–3 mm wide, 1–3-nerved, broadly linear; corolla lobes 0–6, 1.5 mm long (glabrate rabbitbrush) **var. *graveolens***
- 4b Leaves usually less than 1.5 mm wide, 1-nerved, filiform to linear; corolla lobes 1.5–2.5 mm long (Great Basin rabbitbrush) **var. *oreophila***

***Ericameria nauseosa* var. *graveolens* (Nutt.) Reveal & Schuyler, Glabrate rabbitbrush**

Description: Glabrate rabbitbrush forms rounded shrubs that may grow up to 1.6 m tall, with stems that are yellowish green to nearly white and smoothly tomentose. The leaves are broadly linear (to 3 mm wide), up to 9 cm long, 3-nerved, greenish, and often tomentose, becoming glabrate at maturity. The involucre bracts are up to 8 mm long, with fewer than 18 phyllaries that are erect and acutely tipped. The inner faces of the bracts are normally glabrous, but the outer surface may be somewhat hairy. The flowers are up to 9 mm long, with tubes and styles that are sometimes hairy. The achenes are densely hairy, topped by a pappus up to 6.5 mm long.

Habitat and range: This variety occurs in drainage ways, often in somewhat saline soils, across eastern Utah, at 750–2475 m. Glabrate rabbitbrush is known from Idaho to North Dakota and southward to Arizona and New Mexico.

Comments: *Graveolens* refers to the strongly scented foliage.

***Ericameria nauseosa* var. *hololeuca* (A. Gray) G. L. Nesom & G. I. Baird, White rabbitbrush**

Description: White rabbitbrush may grow up to 1.2 m tall, with whitish stems covered with a tomentum of variable density. The leaves are up to 35 mm long and 2 mm wide and 1-nerved, with white tomentose surfaces. The involucre bracts are up to 9 mm long, up to 16 in number, erect, and obtusely tipped, with the outer sides tomentose. The flowers are up to 9.5 mm long, with pubescent to cobwebby outer sides. The achenes are very hairy, with a pappus up to 7 mm long.

Habitat and range: This variety grows on gravelly or sandy slopes. White rabbitbrush is found in all Utah counties except Morgan, Rich, and Summit cos., at 1070–2380 m, and is known from most of the western United States.

Comments: *Hololeuca* means “whole” or “all white.”

***Ericameria nauseosa* var. *oreophila* (A. Nelson) G. L. Nesom & G. I. Baird, Great Basin rabbitbrush**

Description: Great Basin rabbitbrush may grow to over 2 m tall. It has greenish stems covered with a compact green-yellowish tomentum. The leaves are up to 1.5 mm wide and 1-nerved. The involucre are up to 9 mm long and tomentose. The achenes are pilose.

Habitat and range: This variety grows in saline meadows and along watercourses, in salt desert shrub, mountainbrush, and pinyon-juniper communities, at 1280–3000 m. It also occurs from Oregon to Wyoming and southward to Arizona, New Mexico, and California.

Comments: *Ericameria nauseosa* var. *oreophila* is transitional with vars. *speciosa* and *hololeuca*. *Oreophila* means “mountain loving.”

***Ericameria nauseosa* var. *salicifolia* (Rydb.) G. L. Nesom & G. I. Baird, Willowleaf rabbitbrush**

Description: Willowleaf rabbitbrush regularly grows to over 1 m tall, with leaves that are up to 7 cm long and 3–6 mm (rarely more) wide. The involucre bracts are 6–9 mm long. The flowers are 5–9 mm long. The achenes are pilose.

Habitat and range: This handsome variety grows in sagebrush, mountainbrush, pinyon-juniper, and aspen communities across northern and central Utah. It is endemic to Utah, but rather widespread, at 1310–2870 m.

Comments: *Ericameria nauseosa* var. *salicifolia* has been described as a broad-leaved phase of var. *graveolens*, and several intermediates between the two varieties have been recorded. *Salicifolia* refers to the willow-like leaves.

Ericameria nauseosa var. *speciosa* (Nutt.) G. L. Nesom & G. I. Baird, Whitestem rabbitbrush



Description: Whitestem rabbitbrush may grow up to 2 m tall, but on some saline or high elevation alpine sites the plants grow much smaller. The leaves are up to 2 mm wide, 1-nerved, and gray to white tomentose (not yellowish green). The corolla lobes are glabrous and 1–2 mm long. The involucre bracts are 6–9 mm long. The achenes are pilose.

Habitat and range: This variety grows in salt desert shrub, xeric sagebrush, pinyon-juniper, and ponderosa pine communities throughout most of Utah, at 1310–3290 m. It is also known from California, Nevada, New Mexico, Oregon, and Wyoming.

Comments: *Ericameria nauseosa* var. *speciosa* forms intermediates with vars. *oreophila* and *hololeuca*. *Speciosa* means “showy” or “good looking.”

Group B. Rabbitbrush varieties that are usually less than 0.5 m tall; the stems leafy when flowering; and occur only in Utah.

- 1a Involucre bracts clearly aligned in vertical rows; achenes hairy; Daggett and Uintah cos. (Uinta rabbitbrush) **nauseosa** × **uintahensis**
- 1b Involucre bracts not clearly aligned in vertical rows; achenes glabrous **2**
- 2a Plants 10–20 cm tall; stems grayish green when young; leaves grayish green, linear, 15–40 mm long and up to 1 mm wide, densely tomentose; Sevier and Sanpete cos. (Rainbow Hills rabbitbrush) **var. iridis**
- 2b Plants 30–50 cm tall; stems yellowish green; leaves yellowish green, narrowly oblanceolate, 3–7 cm long and up to 2 mm wide, glabrate; Emery, Carbon, Duchesne, and Wasatch cos. (smooth fruit rabbitbrush) **var. psilocarpa**

Ericameria nauseosa var. *iridis* (L. C. Anderson) G. L. Nesom & G. I. Baird, Rainbow Hills rabbitbrush

Description: Rainbow Hills rabbitbrush is a small shrub, up to 3 dm tall at maturity. The leaves are grayish green, densely tomentose, linear, and 1-nerved. The involucre bracts are up to 9 mm long and glabrous.

Habitat and range: This variety is confined to Arapian shale in Sanpete and Sevier cos., at 1675–1980 m.

Comments: *Iridis* refers to the Rainbow Hills region. Rainbow Hills rabbitbrush is of conservation concern.

***Ericameria nauseosa* var. *psilocarpa* (S. F. Blake) G. L. Nesom & G. I. Baird, Smooth fruit rabbitbrush**

Description: Smooth fruit rabbitbrush may grow up to 5 dm tall. The leaves are yellowish green, narrowly oblanceolate, up to 7 cm long and 2 mm wide, and glabrate. The involucre are 8–12 mm long and glabrous. The achenes are glabrous.

Habitat and range: This endemic variety is known only in big sagebrush communities in Emery, Carbon, Duchesne and Wasatch cos., at 1925–2300 m.

Comments: *Psilocarpa* means “naked fruit.” Smooth fruit rabbitbrush is of conservation concern.

***Ericameria nauseosa* × *uintahensis* (L. C. Anderson) G. L. Nesom & G. I. Baird, Uinta rabbitbrush**

Description: Uinta rabbitbrush rarely grows taller than 3 dm. The branchlets are white panmose. The flowers are clustered at the ends of the branches. The achenes are pilose.

Habitat and range: This variety grows in pinyon-juniper communities in northeastern Utah (Daggett and Uintah cos.), at 1675–2015m.

Comments: Uinta rabbitbrush is endemic to Utah. This taxon may be a hybrid between *Ericameria nauseosa* and *E. parryi*.

Group C. Rabbitbrush varieties that are nearly leafless at flowering time.

- | | |
|----|---|
| 1a | Stems whitish, loosely tomentose; involucre bracts usually less than 18, tomentose or scurfy, tomentulose, usually glutinous; achenes glabrous (Bigelow's rabbitbrush) var. <i>bigelovii</i> |
| 1b | Stems yellowish green, compactly tomentose; involucre bracts usually 18–31; achenes glabrous or hairy 2 |
| 2a | Leaves tomentose; involucre bracts tomentose or glabrate; achenes hairy; southern Utah (rush rabbitbrush) var. <i>juncea</i> |
| 2b | Leaves glabrate; involucre bracts glabrous; achenes glabrous; throughout Utah (smoothseed rabbitbrush) var. <i>leiosperma</i> |

***Ericameria nauseosa* var. *bigelovii* (A. Gray) G. L. Nesom & G. I. Baird, Bigelow's rabbitbrush**

Description: Bigelow's rabbitbrush is a low shrub usually less than 5 dm tall. The flowers are 8–10 mm long. The involucre are usually glutinous. The outer surfaces of the involucre bracts are tomentulose. The achenes are glabrous and up to 5.5 mm long.

Habitat and range: This variety occurs on dry slopes and mesas in Emery, Garfield, and San Juan cos., at 1460–1950 m, and is associated with Colorado Plateau shrub and pinyon-juniper communities. It also is found in Arizona, Colorado, and New Mexico.

Comments: *Bigelovii* is named after John Milton Bigelow, a 19th-century American naturalist and participant in expeditions to the American West.

***Ericameria nauseosa* var. *junceae* (Greene) G. L. Nesom & G. I. Baird, Rush rabbitbrush**

Description: Rush rabbitbrush is a larger member of this group and is often more than 6 dm tall. The leaves are up to 3 mm wide and have usually dropped by the time of flowering. The involucre are rarely more than 11 mm long, nonglandular, and straw colored. The flowers are usually up to 10 mm long. The corolla lobes are usually long pilose, but may be glabrate with age. The achenes are pilose.

Habitat and range: This variety occurs primarily in Colorado Plateau shrub and pinyon-juniper communities in southeastern and southern Utah, at 1050–1800 m, and in neighboring Arizona and Nevada.

Comments: *Junceae* means “rush-like.”

***Ericameria nauseosa* var. *leiosperma* (A. Gray) G. L. Nesom & G. I. Baird, Smoothseed rabbitbrush**

Description: Smoothseed rabbitbrush grows to well over 3 dm tall on favorable sites. The flowers produce corollas up to 8 mm long. The involucre may be up to 9 mm long and 3 mm wide. The achenes are glabrous.

Habitat and range: This variety grows in xeric sagebrush, Colorado Plateau shrub, pinyon-juniper, and ponderosa pine communities, at 1070–2745 m. It also occurs in Nevada and California.

Comments: Introgression with var. *bigelovii* may occur. *Leios* means “smooth” or “polished” and *sperma* means “seed.”

Group D. Rabbitbrush varieties that grow mostly in sandy soils and are leafy when flowering.

- | | |
|----|---|
| 1a | Stems grayish green to white, moderately tomentose; leaves grayish green, tomentose, up to 7 cm long; involucre bracts in strong vertical ranks; achenes hairy (sand rabbitbrush) var. <i>arenaria</i> |
| 1b | Stems yellowish green, densely tomentose 2 |
| 2a | Plants 6–15 dm tall; leaves yellowish green, up to 5 cm long, glabrate (shiny rabbitbrush) var. <i>nitida</i> |
| 2b | Plants 4–6 dm tall; leaves grayish green, up to 2 cm long, tomentose (dune rabbitbrush) var. <i>turbinat</i> |

***Ericameria nauseosa* var. *arenaria* (L. C. Anderson) G. L. Nesom & G. I. Baird, Sand rabbitbrush**

Description: Sand rabbitbrush may grow up to 1.2 m tall, with erect stems and bark that is white and tomentose. The leaves are up to 7 cm long and 5 mm wide, linear and flat. The heads are numerous, in panicle cymes. The involucre are up to 11 mm long and 7 mm wide. The bracts are strongly ranked, obtuse to short acuminate, and over 10 mm long. The outer bracts are sparingly tomentose to glabrate. The corollas are yellow and up to 10 mm long. The achenes are pilose.

Habitat and range: This variety occurs in sagebrush and pinyon-juniper communities. It grows on deep sandy soils and dunes in southern, central, and eastern Utah, at 1675–1830 m. *Ericameria nauseosa* var. *arenaria* is similar to var. *turbinatus*, as both share aligned bracts and sandy habitats. It is also similar to var. *junceus*, which is more common in the Colorado, San Juan and Virgin River drainages.

Comments: *Arenaria* means “of sand” or “sandy places.”

***Ericameria nauseosa* var. *nitida* (L. C. Anderson) G. L. Nesom & G. I. Baird, Shiny rabbitbrush**

Description: Shiny rabbitbrush is often more than 5 dm tall. The leaves are yellowish green, glabrate, and 1-nerved. The involucre are 9–11 mm long and form cylindrical to triangular-shaped heads. The involucre bracts are distinctly aligned. The achenes are usually glabrous and up to 4 mm long.

Habitat and range: This variety occurs in sandy gravels in Colorado Plateau shrub communities in Kane and San Juan cos., at ca. 1250 m, and in adjacent parts of Arizona.

Comments: *Nitida* means “bright and shining.”

***Ericameria nauseosa* var. *turbinata* (M. E. Jones) G. L. Nesom & G. I. Baird, Dune rabbitbrush**

Description: Dune rabbitbrush is commonly more than 4 dm tall. The leaves are grayish green, tomentulose to densely tomentose, and linear, up to 2 cm long and 1.5 mm wide. The involucre bracts are clearly aligned. The involucre are usually more than 10 mm long and form cylindrical heads, with the bracts of similar height and not strongly keeled. The corollas are 9–12 mm long and villous. The achenes may be pilose or glabrate.

Habitat and range: This variety occurs primarily on sand dunes in salt desert shrub and pinyon-juniper communities throughout most of Utah, at 1370–1720 m. It is also found in Arizona and Nevada.

Comments: *Turbinata* means “shaped like a top.”

***Ericameria obovata* (Rydb.) G. L. Nesom, Rydberg’s goldenbush**

Description: Rydberg’s goldenbush is an aromatic low shrub, up to 3 dm tall. The stems are stipitate glandular. The leaves are obovate to spatulate, up to 3 cm long and 1.2 cm wide, and densely stipitate glandular. The bracts are up to 6 mm long and somewhat unequal, with acute tips. The outer bracts are greenish, and the inner bracts are chartaceous. The ray flowers number 4–9 and are up to 1 cm long, and the disk flowers number 9–15. The achenes are tan to reddish brown, up to 4.5 mm long, and villous, with a tan pappus.

Habitat and range: Rydberg’s goldenbush grows in rocky outcrops and cliff faces in xeric sagebrush, pinyon-juniper, and ponderosa pine communities, at 1300–3000 m.

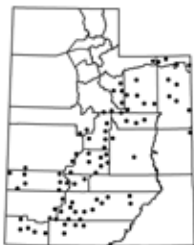
Comments: *Ericameria obovata* differs from *E. watsonii* in that Rydberg’s goldenbush has more obovate leaves that are slightly wider, and heads that have fewer disk flowers. *Obovata* refers to the obovate shape of the leaves.

Ericameria paniculata (A. Gray) Rydb., Mojave rabbitbrush

Description: Mojave rabbitbrush is a large aromatic shrub, often growing up to 2 m tall. The bark is green, becoming tan or gray. The stems are gland dotted, resinous, and often black banded or splotched, due to fungal infections. The leaves are up to 3 cm long and 1 mm wide, linear, often terete, glabrous, gland dotted, resinous, and have mucronate tips. The heads are numerous and borne in conical panicles, with involucre bracts up to 7 mm long. The flowering heads are 2–3 mm wide. The bracts are chartaceous, rigid, and usually without glands. The disk flowers are 5–6 mm long, yellow, and bloom in September–November, and ray flowers are absent. The achenes are 2–3 mm long and pilose.

Habitat and range: Mojave rabbitbrush occurs in Mojave Desert shrub communities, preferring stream banks, road edges, and slopes, at 670–1220 m, in Washington Co., as well as in Arizona, Nevada, and California.

Comments: *Paniculata* refers to the paniculate inflorescence.

Ericameria parryi (A. Gray) G. L. Nesom & G. I. Baird, Parry's rabbitbrush

Description: Parry's rabbitbrush can be distinguished from *Ericameria nauseosa* by having involucre bracts that are long attenuate and membranous, and inflorescences that are more or less racemose. Otherwise the taxa are very similar, and intermediates are well documented. *Ericameria parryi* lacks ray flowers and blooms in July–September. The twigs are densely hairy, or sometimes tomentose, and usually lack glands. Four varieties are recognized in Utah, and this species forms hybrids with *E. nauseosa*. Parry's rabbitbrush has some value as an ornamental. It tends to increase with overgrazing.

Key to Varieties of *Ericameria parryi*

- 1a Plants up to 10 dm tall; leaves 3–8 cm long, glabrous or puberulent, sometimes minutely stipitate glandular, green, and 3-nerved (only the midnerve prominent); florets 8–20**var. *parryi***
- 1b Plants up to 6 dm tall; leaves 1.5–4 cm long, tomentulose to tomentose; florets 4–9**2**
- 2a Leaves gland dotted, resinous, and densely tomentulose, moderately crowded; florets clear yellow **var. *nevadensis***
- 2b Leaves not gland dotted or resinous, but tomentulose or tomentose and crowded; flowers pale yellow **3**
- 3a Leaves greenish yellow, 1–2 mm wide, tomentulose; distal leaves shorter than the inflorescence **var. *affinis***
- 3b Leaves gray, 1 mm wide, tomentose; distal leaves often overtopping the inflorescence **var. *howardii***

Ericameria parryi var. *affinis* (A. Nelson) G. L. Nesom & G. I. Baird

Description: *E. parryi* var. *affinis* is seldom more than 6 dm tall. The stems are covered with a white tomentum. The leaves are greenish yellow, usually up to 4 cm long and 1–3 mm wide, 1–3-nerved, viscid, and sometimes tomentulose. The upper leaves are usually shorter than the inflorescence. The flowers are pale yellow and borne in elongate subracemose inflorescences, with 5–9 flowers per head. The corollas are up to 10 mm long, with corolla lobes up to 1 mm long. The involucral bracts are up to 15 mm long and 8 mm wide, and sometimes glabrous or puberulent. The outer bracts are elongate, with slender herbaceous tips. The inner bracts are chartaceous. The achenes are up to 7.5 mm long and pilose.

Habitat and range: This variety grows in xeric shrub, big sagebrush-grass, pinyon-juniper, and ponderosa pine communities. It occurs in most northern and central counties in Utah, at 1600–2565 m, and in adjacent Colorado and Nevada.

Comments: *Affinis* means “related.” *Ericameria parryi* var. *affinis* is of conservation concern.

Ericameria parryi var. *howardii* (Parry ex A. Gray) G. L. Nesom & G. I. Baird, Howard’s rabbitbrush

Description: Howard’s rabbitbrush is similar to *Ericameria parryi* var. *affinis*, but the leaves of var. *howardii* are grayish, 1 mm wide, and tomentose, with the upper leaves usually overtopping the inflorescences. The corolla lobes are 1.8–2.2 mm long.

Habitat and range: This variety occurs in xeric sagebrush, pinyon-juniper, sagebrush-grass, aspen-mixed conifer, and Douglas fir communities in most northern and central Utah counties, at 1890–3080 m, and from Wyoming to Nebraska and southward into New Mexico and Arizona.

Comments: *Howardii* is named after Leland Ossian Howard, a late 19th- to mid-20th-century American entomologist.

***Ericameria parryi* var. *nevadensis* (A. Gray) G. L. Nesom & G. I. Baird, Nevada rabbitbrush**

Description: Nevada rabbitbrush is similar to var. *howardii*, but the leaves of var. *nevadensis* are gland dotted, resinous, densely tomentulose, and moderately crowded. The leaves are also usually shorter than the inflorescence. The corollas are clear yellow, not pale, with the corolla lobes 1–1.5 mm long.

Habitat and range: This variety occurs in xeric sagebrush, pinyon-juniper, sagebrush-grass, mountainbrush, and ponderosa pine communities in northern and central Utah, at 1830–2565 m. It also grows in Arizona, California, Nevada, and Oregon.

Comments: *Nevadensis* means “of Nevada.”

***Ericameria parryi* var. *parryi*, Parry's rabbitbrush**

Description: Parry's rabbitbrush is similar to other varieties of *Ericameria parryi*, but it does differ in several ways. The plants are usually taller, up to 1 m tall. The leaves are up to 8 cm long, glabrous, puberulent, or minutely stipitate glandular, green, usually crowded, and somewhat 3-nerved. The upper leaves usually extend beyond the inflorescence. The flowers are 8–20 per head. The corolla lobes are up to 2.1 mm long.

Habitat and range: This rabbitbrush variety is widespread in the Rocky Mountains. It occupies ponderosa pine, mountainbrush, sagebrush-grass, aspen-mixed conifer, and spruce-fir communities. It is reported from Garfield, Grand, and Kane cos., at 2075–2685 m, and from Wyoming, Colorado, New Mexico, and Nevada.

Comments: *Parryi* honors Charles Christopher Parry, a 19th-century British-born American botanist and student of John Torrey, Asa Gray, and George Engelmann.

Ericameria watsonii (A. Gray) G. L. Nesom, Watson's goldenbush



Description: Watson's goldenbush is a small shrub that is rarely more than 4 dm tall. The stems are initially yellowish but become grayish, tan, or brown with age. The leaves are long stipitate glandular and elliptic to oblanceolate, 10–12 mm long and 3–8 mm wide, with margins that are entire or undulate and acute to apiculate tips. The involuclral bracts are in 3–4 series, unequal, and up to 8 mm long. The outer bracts are leafy and stipitate glandular. The heads usually have 12–22 disk flowers and 4–8 ray flowers. The achenes are usually 5 ribbed and hairy, with a tan pappus.

Habitat and range: *Ericameria watsonii* grows in rocky outcrops and cliff crevices in xeric sagebrush, pinyon-juniper, mountainbrush, and ponderosa pine communities in Beaver and Millard cos. It also occurs in Nevada and Arizona.

Comments: *Watsonii* is named after Sereno Watson, a botanist for Clarence King Expedition in California in the 19th century and curator of the Harvard Herbarium.

Ericameria zionis (L. C. Anderson) G. L. Nesom, Cedar Breaks goldenbush

Description: Cedar Breaks goldenbush is a small shrub that grows up to 3 dm tall. The leaves are narrowly oblanceolate, up to 3.5 cm long and 4.5 mm wide, 1-nerved, entire margined, and abruptly mucronate, with minute stipitate glands. The 1–3 flowering heads are in cymose inflorescences, bearing pedunculate flowers. The involuclral bracts are up to 15 mm tall and 12 mm wide, forming cylindric or campanulate heads. The bracts are subequal. The outer bracts are herbaceous and green, while the inner bracts are chartaceous and bear a green spot near the tip. The disk flowers are yellow, up to 20 in number, and bloom in midsummer. Ray

flowers are absent. The achenes are glabrous below, strigose near the tip, and have a tawny pappus.



Habitat and range: *Ericameria zionis* grows in ponderosa pine and spruce-fir forests on limestone soils. It is endemic to Garfield, Iron, and Kane cos., between 2440 and 3050 m.

Comments: *Zionis* refers to the area in southern Utah where this plant is found. Cedar Breaks goldenbush is of conservation concern.

***Gutierrezia* Lag.**

Gutierrezia is presumed to honor the Gutierrez, a noble Spanish family.

***Gutierrezia microcephala* (DC.) A. Gray, Small-head snakeweed**



Description: Small-head snakeweed is a rounded subshrub that can grow up to 1 m tall, but is usually smaller. The stems are woody at the base

and green above, becoming straw colored or grayish. Two types of leaves are produced: the stem leaves are up to 5 cm long and 4 mm wide, linear or lanceolate; the axillary leaves are shorter and narrower. The sessile flowering heads cluster at the branch ends. The involuclral bracts are up to 4 mm long and 1.5 mm wide and usually fewer than 10. The heads are cylindric, have 1–2 ray flowers up to 4 mm long, and 1–3 disk flowers up to 3 mm long. The disk flowers are sterile. The ray flowers produce achenes that are 2–3 mm long and pubescent. The pappus consists of 8 scales.

Habitat and range: *Gutierrezia microcephala* occurs in Mojave Desert shrub and Colorado Plateau shrub communities in eastern and central Utah, at 850–1830 m. It also is found in Texas, New Mexico, Colorado, Nevada, and Southern California.

Comments: *Microcephala* refers to the small-headed inflorescence.

***Gutierrezia petradoria* (S. L. Welsh & Goodrich) S. L. Welsh, Goldenrod snakeweed**



Description: Goldenrod snakeweed is a small subshrub, up to 4 dm tall, and is woody only at the base. The stems are numerous and usually unbranched below their middle. The leaves are linear to oblanceolate, up to 6 cm long and 3 mm wide, and subglabrous to scabrous, sometimes with glands scattered among the hairs. The basal leaves are persistent. The flowering heads are coarse, with flowers that are yellow and bloom in late summer. The flowers appear at the ends of short-bracted, wiry, pedunculate branches that may be up to 6 cm long. The involuclral bracts are imbricate, glutinous, turbinate or campanulate, and up to 8 mm long and 2.5 mm wide. Each head

bears up to 33 individual flowers, which include up to 10 showy ray flowers. The achenes are 3–4 mm long. The pappus consists of 10–12 scales.

Habitat and range: Goldenrod snakeweed is endemic to the Pavant and Canyon mountains of Millard Co., in dry, rocky, open places in sagebrush-grass, mountainbrush, and aspen-mixed conifer communities, at 1800–2840 m.

Comments: The coarse heads and imbricate involuclral bracts distinguish *Gutierrezia petradoria* from other species in the genus. *Petro* suggests “among the rocks” and *dorrii* means “gift.”

***Gutierrezia pomariensis* (S. L. Welsh) S. L. Welsh, Orchard snakeweed**

Description: Orchard snakeweed is smaller than others in the genus and confined to northeastern Utah. The stems are woody only at the base and grow up to 5 dm tall on favorable sites. Basal leaves are absent at flowering. The cauline leaves are linear, up to 6 cm long and 3 mm wide, and well distributed along the stems. The leaves are firm and scabrous, or sometimes glandular scabrous, with small glands. The involuclres are cylindric to turbinate campanulate, with 12–20 bracts, and appear shingled. The bracts have rounded thickened tips and are green, with scattered glands along their length. The flowers are borne on the ends of short-bracted pedunculate branches up to 4 cm long. The flowering stems are open, and



Photo by Sheryl Goodrich

the flowers yellow, sessile or borne on short branches, and clustered in few-flowered glomerules. The heads have 5–7 ray flowers up to 5 mm long, with up to 15 disk flowers that bloom in July–October. The achenes are 2 mm long, with a pappus that consists of 1–2 series of scales.

Habitat and range: Orchard snake-weed occurs in dry, open scablands, between 1450 and 2150 m, in pinyon-juniper, salt desert shrub, and xeric sagebrush communities.

Comments: *Gutierrezia pomariensis* is endemic to Duchesne and Uintah cos. *Pomariensis* is derived from the Latin *pomum*, “an orchard fruit,” and refers to Orchard Creek Draw, where the type specimen was collected.

***Gutierrezia sarothrae* (Pursh) Britton & Rusby, Broom snakeweed**



Description: Broom snakeweed is a rounded compact subshrub, woody only at the base, that rarely grows to over 5 dm tall. Stems of the year are numerous, erect, slender, and brittle. The leaves are linear, up to 5 cm long and 2 mm wide, scabrous, and punctate. The inflorescences are roughly flat topped, with yellow flowers, and bear up to 7 ray and 8 disk flowers. The involucre bracts are up to 5 mm long and 2.5 mm wide and number up to 14 per head. The heads are cylindric to obconic. The

achenes are hairy and up to 2 mm long. The pappus consists of 1–2 series of scales.

Habitat and range: Broom snakeweed is a very common species throughout the Intermountain West, at 760–2880 m, in Mojave Desert shrub, xeric sagebrush, Colorado Plateau shrub, mountainbrush, pinyon-juniper, and ponderosa pine communities.

Comments: *Gutierrezia sarothrae* increases on overgrazed sites. *Sarothrae* means “broom.”

***Isocoma* Nutt.**

Isocoma means “equal hairs.”

***Isocoma rusbyi* Greene, Rusby’s goldenbush**



Description: Rusby’s goldenbush is a subshrub that grows up to 8 dm tall and is woody only at the base. The young stems are straw colored and longitudinally striate, with hairs in lines. The leaves are linear to spatulate, up to 7.5 cm long and 16 mm wide, with margins that are entire or irregularly lobed. The flower heads vary from few to numerous and are borne in corymbose cymes. The turbinate involucre are up to 8 mm long and 7 mm wide. The involucral bracts occur in fewer than 5 series, and are lance-oblong and thickish, with a greenish or brownish spot near the acute tips. The disk flowers are yellow and bloom in August–September. Ray flowers are absent. The achenes are silky pubescent and bear a tawny pappus.

Habitat and range: Rusby’s goldenbush occurs in saline washes, stream bottoms, and terraces, in southeastern and southcentral Utah at 1050–1800 m. It also is found from Colorado southward into Texas, New Mexico, and Arizona.

Comments: *Rusbyi* honors Henry Hurd Rusby, a mid-19th- to mid-20th-century American botanist who was one of the founders of the New York Botanical Garden.

***Lepidospartum* (A. Gray) A. Gray**

Lepidospartum means “pretty broom.”

***Lepidospartum latisquamum* S. Watson, Nevada broomshrub**

Description: Nevada broomshrub is a large broom-like shrub growing up to 1.5 m tall. The stems are longitudinally striate, with glandular lines separated by strips of tomentum. The leaves are alternate and narrowly linear, up to 4 cm long. The flower heads are up to 10 mm long and 6 mm wide, with bracts that are chartaceous and tomentose. The outer bracts are short and apiculate, while the inner bracts are hyaline, with broadly rounded tips. The disk flowers are yellow and bloom in July–August. Ray flowers are absent. The achenes are up to 5 mm long, with copious long pilose hairs up to 4 mm long.

Habitat and range: *Lepidospartum latisquamum* grows in gravelly or sandy desert washes. In Utah, it is known from one population, at 1700–1740 m, in the Pine Valley in Millard Co. The species also occurs in Nevada and California.

Comments: *Latis* means “broad” or “wide” and *squamum* means “scales” or “scaly.”

***Lorandersonia* Urbatsch, R. P. Roberts & Neubig**

Lorandersonia honors Loran Crittenden Anderson, a present-day American botanist who has specialized in *Chrysothamnus*.

Lorandersonia baileyi (Wooton & Standl.) Urbatsch, R. P. Roberts & Neubig, Bailey's rabbitbrush

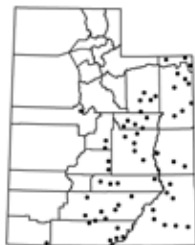


Description: Bailey's rabbitbrush grows to 1 m tall on favorable sites. The stems are white in the first year, becoming tan or brown with age, and may be glabrate or puberulent. The leaves are up to 3 cm long and 1–2 mm wide, linear to narrowly oblanceolate, and flat or revolute, with mucronate tips. The involucre bracts are acute or obtuse but not acuminate, up to 15 mm tall and 6 mm wide. The flowers are borne in corymbose panicles. Ray flowers are lacking. The corollas of the disk flowers are up to 10 mm long, yellow, and bloom in August–September. The achenes are 4.5–7 mm long, sharply 4-angled, glandular, and more or less hairy.

Habitat and range: *Lorandersonia baileyi* occurs in Colorado Plateau shrub, pinyon-juniper, and ponderosa pine communities. It occupies high open plains, especially on sandy sites, in Emery, Wayne, and San Juan cos., at 1370–2350 m. It is also known from Arizona, Colorado, Kansas, New Mexico, Oklahoma, Texas, and Mexico.

Comments: *Baileyi* is named after Vernon Orlando Bailey, chief naturalist of the U.S. Biological Survey from 1899 to 1933.

Lorandersonia linifolia (Greene) Urbatsch, R. P. Roberts & Neubig, Spearleaf rabbitbrush



Description: Spearleaf rabbitbrush grows up to 3 m tall on favorable sites, with stems that are erect or ascending. The bark is white and

glabrous. The leaves are up to 8 cm long and 9 mm wide, flat, oblong to elliptic or lanceolate, and glabrous or scabrous-ciliate. The flowering heads are borne at the twig tips in corymbose inflorescences, which is a diagnostic character for this species. The involucre are up to 7 mm high and 3 mm wide, and the bracts are loosely ranked. The outer bracts are herbaceous at the tip. The inner bracts are glandular on the thickened mid-rib and rounded at the tip. Ray flowers are absent. The disk flower corollas are yellow, up to 6 mm long, and bloom in July–September. The achenes are up to 2.8 mm long and pilose.

Habitat and range: *Lorandersonia linifolia* occurs along waterways and springs, especially in alkaline soils, in the Colorado River drainage system. It is found throughout Utah, at 1130–2535 m, and is known from Arizona, Colorado, Montana, New Mexico, and Wyoming.

Comments: *Linifolia* refers to the flax-like leaves.

***Parthenium* L.**

Parthenium is Greek for “virgin” or “pure.”

***Parthenium incanum* Kunth, Mariola**



Description: Mariola is an aromatic shrub, growing up to 1 m tall, with branching stems that are loosely tomentose to glabrate. The leaves are short petioled, 2–5 cm long and up to 1.5 cm wide, with lobed margins, white tomentose below, more sparsely pubescent above, and gland dotted. The several to many flowering heads are borne in a corymbose inflorescence. Each head is up to 5 mm wide, has 5 ray flowers, and may have over 20 disk flowers. The flowers are pale yellow or whitish and bloom in May–November. The outer involucre bracts are oblong and villous, with acute tips. The inner bracts are suborbicular and bear 2 or more pubescent awns. The achenes are up to 2 mm long, black, and pubescent along a median line.

Habitat and range: *Mariola* grows in rock crevices and open areas, often on limestone soils, in Mojave Desert shrub communities. It occurs in the Beaver Dam Mountains of Washington Co., at 1000–1220 m. It is also known from Arizona, New Mexico, Nevada, Texas, and Mexico.

Comments: *Parthenium incanum* is extremely drought tolerant. *Incana* refers to becoming gray or white with age.

***Perityle* Benth.**

Perityle is Greek for *para*, meaning “around,” and *tyle*, meaning “a callus,” referring to the thick callous margins of the achenes.

***Perityle specuicola* S. L. Welsh & Neese, Alcove rock daisy**



Description: Alcove rock daisy is a subshrub that grows up to 7.5 dm tall, with stems that are sprawling in most cases, but occasionally erect. Both the branches and the foliage are glandular hispidulous. The leaves are primarily alternate, with short petioles. The blades are up to 6 mm long and 3 mm wide, ovate to elliptic. The margins are entire and hispidulous. The flower heads are arranged in corymbose inflorescences. Ray flowers are absent, but pale yellow disk flowers are numerous and bloom in spring–fall. The involucre bracts are up to 5 mm long and 6 mm wide, keeled, oblong-elliptic, and up to 16 in number. The achenes are up to 3.8 mm long, flattened, with thickened margins, and topped by a few flattened and scabrous scales.

Habitat and range: *Perityle specuicola* is endemic to southeastern Utah, at 1125–1280 m, growing along alcoves and cliff bases and in hanging gardens of the San Juan and Colorado rivers in Grand and San Juan cos.

Comments: Alcove rock daisy is rush-like, and the new growth is often obscured by the stems of the previous season. *Specu* means “cave or alcove” and *cola* means “to inhabit.” Alcove rock daisy is of conservation concern.

***Perityle stansburii* (A. Gray) J. F. Macbr., Stansbury's rock daisy**

Description: Stansbury's rock daisy is a small subshrub that is rarely more than 3 dm tall. The leaves are alternate, glandular hispidulous, and up to 14 mm long and 12 mm wide, broadly ovate or deltoid, with margins that commonly bear few lobes. The petioles are up to 14 mm long. The flower heads are arranged in corymbose inflorescences. The involucre is up to 6.5 mm long and 10 mm wide. There are up to 21 bracts that are oblong or oblanceolate and strongly keeled. The flowering heads have up to 14 yellow ray flowers and numerous disk flowers that bloom in spring–fall. The achenes are up to 3.5 mm long, with short pubescent margins. The pappus consists of a single stout bristle and a short crown of transparent scales.

Habitat and range: *Perityle stansburii* grows primarily in rock crevices in xeric sagebrush, pinyon-juniper, and mountainbrush communities in western Utah, at 1280–2075 m, and in adjacent Nevada. It is endemic to the Great Basin.

Comments: Stansbury's rock daisy is drought tolerant and often used as a rock-garden ornamental. *Stansburii* honors Captain Howard Stansbury, leader of the first exploration of the Great Salt Lake Valley. *Perityle stansburii* is of conservation concern.

***Perityle tenella* (M. E. Jones) J. F. Macbr., Jones' rock daisy**

Description: Jones' rock daisy is a small subshrub or perennial, growing up to 2.5 dm tall, with young stems and leaves that are glandular villous. The leaves are up to 13 mm long and 15 mm wide, deltoid-ovate, with obtuse, truncate, or cordate bases and attenuate tips. The leaf margins are entire to distinctly toothed. The petioles are up to 8 mm long. The heads are solitary to numerous, arranged in corymbose inflorescences. The involucre is up to 6.5 mm long and 10 mm wide, with up to 18 bracts that are keeled and lance-elliptic. The flowering heads lack ray flowers. The yellow disk flowers are numerous, up to 4 mm long, and bloom in

spring–fall. The achenes are up to 3 mm long and have short pubescent margins. The pappus consists of a single bristle.



Habitat and range: Jones' rock daisy occurs in Kane and Washington cos., at 915–2350 m. It grows on rocky slopes and crevices of limestone or sandstone in Mojave Desert shrub, pinyon-juniper, and ponderosa pine communities. It also is found in adjacent Arizona and Nevada.

Comments: *Tenella* means “slender,” “tender,” or “soft.” *Perityle tenella* is a species of conservation concern.

Petradoria Greene

Petra means “rock” and *doria* means “gift.”

***Petradoria pumila* (Nutt.) Greene, Rock goldenrod**

Description: Rock goldenrod is a small subshrub or perennial that grows up to 2.5 dm tall. The stems are woody only at the base. The leaf bases are persistent and remain attached for many years. The leaves are up to 9 cm long and 1–12 mm wide, linear to narrowly lanceolate, and smaller in size as they grow toward the top of the stem. The involucres are up to 10 mm high and 3 mm wide, with the bracts arranged in 3–6 series and 10–21 in number. The bracts are usually keeled. The flowering heads have 1–3 yellow ray flowers and 2–5 disk flowers that bloom in summer–fall. The achenes are up to 5 mm long, glabrous, and bear up to 9 strong nerves.

Habitat and range: Rock goldenrod grows in xeric sagebrush, Colorado Plateau shrub, pinyon-juniper, mountainbrush, sagebrush-grass, and ponderosa pine communities. It is found throughout Utah, at 1525–3100 m, and in Arizona, California, Colorado, Idaho, Nevada, New Mexico, Wyoming, and Mexico.



Comments: *Pumila* means “diminutive” or “dwarfish.” Two varieties have been recognized. *Petradoria pumila* var. *graminea* (Wootton & Standl.) S. L. Welsh has leaves that are 1–2 mm wide and usually 1-nerved, and it usually has 1 ray flower. *P. pumila* var. *pumila* has leaves that are up to 2–12 mm wide and 3–5-nerved, and heads that usually produce 2–3 ray flowers. This latter variety is more common in Utah.

***Peucephyllum* A. Gray**

Peuke means “pine- or fir-like” and *phylum* means “leaves,” referring to the plant’s superficial resemblance to a fir tree.

***Peucephyllum schottii* A. Gray, Pygmy cedar**



Description: Pygmy cedar grows up to 2 m tall. It is evergreen, with a main stem that produces numerous branches to form a rounded flat-topped shrub. The leaves are alternate, up to 12 mm long, linear or rounded, and

gland dotted. The heads are discoid and subsessile. The involucre are up to 8 mm long, resinous and green. The flowers are yellow and bloom in March–May. The achenes are up to 4 mm long, with a tawny pappus up to 4 mm long.

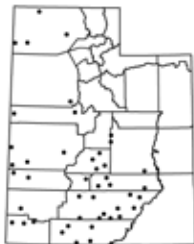
Habitat and range: Pygmy cedar occurs on rocky outcrops in Mojave Desert shrub communities in Washington Co., usually below 1100 m, and in Arizona, California, and Nevada.

Comments: *Peucephyllum schottii* can live up to 100 years or more. This shrub has an odor resembling cedar. *Schottii* honors Arthur Carl Victor Schott, a 19th-century German-born naturalist with the U.S. Boundary Commission Survey.

***Pleiacanthus* (Nutt.) Rydb.**

Pleiacanthus means “more prickly than usual.”

***Pleiacanthus spinosus* (Nutt.) Rydb., Thorny skeletonweed**



Description: Thorny skeletonweed is a subshrub or perennial that is woody only at the base and grows up to 50 cm tall. The lower stems are covered with dead, brownish leaf bases. The leaf axils are heavily villous. The branches are rigidly divergent and spine tipped, with milky juice. The leaves are all cauline, sessile, linear, up to 7 cm long and 3 mm wide, and often drop before the flowers open. The flower heads are up to 10 mm long and 5 mm wide. The involucre bracts are oblong or lance-oblong and green or sometimes purplish. The ray flowers are pink to lavender, up to 5 mm long, and bloom in July–September. The achenes are up to 5 mm long, smooth, and topped with a white pappus up to 5 mm long.

Habitat and range: *Pleiacanthus spinosus* occurs on sandy gravelly washes and slopes in xeric sagebrush, Colorado Plateau shrub, mountain-brush, and pinyon-juniper communities. It is found in much of Utah, at 1675–3050 m, and throughout the western United States.

Comments: *Spinosus* means “spiny.”

***Pluchea* Cass.**

Pluchea is named after Abbé Noël Antoine Pluche, an 18th-century French naturalist.

***Pluchea sericea* (Nutt.) Coville, Arrowweed**

Description: Arrowweed stems are straight, erect, and willow-like, with sericeous pubescence throughout and distinct longitudinal lines. The plants may grow as tall as 3 m under ideal conditions. The leaves are sessile and lanceolate, up to 4.5 cm long and 9 mm wide, with entire margins. The flower heads have involucre that are up to 5 mm long and 7 mm wide. The involucral bracts are ovate or ovate lanceolate, deciduous, acutely tipped, and often tinged with purple. The purple flowers are numerous in each head and bloom in March–July. The achenes are glabrous and bear a pappus of bristles that are dilated apically.

Habitat and range: *Pluchea sericea* grows in riparian areas and pond edges along the Colorado and Virgin rivers in southern Utah, at 850–1220 m. It also occurs from Texas to California and southward into Mexico.

Comments: Arrowweed has been used by Native Americans for arrows, thatching, food, and medicines. *Sericea* means “silky.”

***Porophyllum* Adans.**

Porophyllum means “leaves with numerous transparent spots or holes.”

***Porophyllum gracile* Benth., Odora**

Description: *Odora* is an ill-scented subshrub, 2–7 dm tall and woody only at the base. The stems are much branched. The leaves may be alternate, opposite, or both, up to 4 cm long, linear-filiform, with entire margins and oil glands, glabrous, and dark green, often tinged with purple. The flower heads are subcylindric, with bracts up to 15 mm long, and green,

tinged with purple. The flowers are purple or white, gibbous at their base, bear prominent dark glands toward their tips, and bloom in April–May. The achenes are up to 9 mm long, with a pappus of pinkish bristles.

Habitat and range: *Porophyllum gracile* grows in Colorado Plateau shrub communities in both San Juan and Washington cos., at 915–1560 m. Elsewhere, it occurs in Arizona, California, New Mexico, Texas, and Mexico.

Comments: *Gracile* means “slender” or “graceful.”

***Psilostrophe* DC.**

Psilo means “naked” or “smooth” and *stroph* means “to turn.”

***Psilostrophe cooperi* (A. Gray) Greene, Whitestem paperflower**



Description: Whitestem paperflower may grow up to 6 dm tall, with stems that are white tomentose and woody only at their base. The alternate leaves are up to 7 cm long, linear, with entire margins, sometimes tomentose when young, and glabrous at maturity. The involucre bracts are up to 8 mm long and about as wide, and glabrous at maturity. The ray flowers are yellow, 8 in number, and up to 2 cm long. The disk flowers number 9–25 and bloom in April–June. The achenes are glabrous, sometimes gland dotted, up to 7 mm long, and white. The pappus consists of 4–6 scales up to 2 mm long.

Habitat and range: Whitestem paperflower grows in Mojave Desert shrub and pinyon-juniper communities in Kane (rare) and Washington cos., at 800–1225 m. Elsewhere, it occurs in Arizona, California, Nevada, and New Mexico.

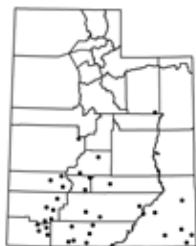
Comments: When the ray flowers dry, they act as papery wings that disperse the seed. *Psilostrophe cooperi* is drought tolerant and used in xeric landscaping. *Cooperi* honors James Graham Cooper, a 18th-century surgeon, ornithologist, and naturalist for the California Geological Survey.

Senecio L.

Senecio means “like an old man” and refers to the fluffy white seed heads.

***Senecio flaccidus* Less., Douglas’ groundsel**

Two varieties of *Senecio flaccidus* are recognized in Utah. Where their ranges overlap, the taxa may intergrade.

***Senecio flaccidus* var. *flaccidus*, Hairy senecio**

Description: Hairy senecio grows up to 1 m or more tall and is woody only at the base. The stems are erect, with leaves that are simple and linear-filiform, up to 11 cm long. The heads are in subcorymbose inflorescences. The involucre is cylindric to weakly campanulate, with bracts up to 8 mm long. The bractlets are minute or absent. Each flowering head has up to 17 yellow ray flowers up to 18 mm long, and appearing in May–October. The achenes are hairy, with a white pappus.

Habitat and range This variety rarely grows in association with creosote bush. It prefers dry, open slopes and is found along the edges of dry washes in sagebrush or pinyon-juniper communities, and is known from Beaver, Duchesne, Garfield, Iron, Kane, Millard, Piute, San Juan, Sevier, Washington and Wayne cos., at 1095–2200 m. It occurs from Arizona to Texas.

Comments: Hairy senecio is a poor forage plant for livestock, due to alkaloids that cause liver damage. It readily colonizes disturbed areas and increases with overgrazing. *Flaccidus* means “flabby” or “hanging down.”

Senecio flaccidus var. *monoensis* (Greene) B. L. Turner & T. M. Barkley, Glabrous senecio



Description: Glabrous senecio grows up to 1 m tall, with stems and leaves that become glabrous. The leaves are narrowly linear to filiform, up to 11 cm long. The heads are in subcorymbose inflorescences. The involucre is campanulate, with bracts up to 10 mm long. The bractlets are well developed. The ray flowers are yellow and bloom in spring–fall. The achenes are hairy.

Habitat and range: This variety occurs in Washington Co., growing in Mojave Desert shrub and pinyon-juniper communities, at 760–1465 m. It is also known from California to Texas.

Comments: Glabrous senecio increases with overgrazing and readily colonizes disturbed sites. *Monoensis* refers to Mono Co., California.

***Sphaeromeria* Nutt.**

Sphaero means “spherical” or “rounded” and *meria* means “divided.”

***Sphaeromeria diversifolia* (D. C. Eaton) A. Heller, False sagebrush**

Description: False sagebrush is an aromatic subshrub, growing up to 4 dm tall. The foliage is glabrous, and the leaves are simple, linear, up to 5.5 cm long and 5 mm wide, and entire, irregularly toothed, or lobed. The flowering heads are borne in open cymose inflorescences. The involucre bracts are up to 4 mm long. The corollas are yellow, up to 2.5 mm long, and bloom in July–September. The achenes are glabrous, or gland dotted, and ribbed. A pappus is usually lacking.



Habitat and range: *Sphaeromeria diversifolia* is endemic to the Great Basin, occurring in rock crevices or steep rocky cliffs in mountain ranges in western Utah, at 1370–3200 m. It also is found in Nevada.

Comments: *Diversifolia* refers to the variable or diverse leaves.

Sphaeromeria ruthiae A. H. Holmgren, L. M. Shultz & Lowrey, Ruth's sphaeromeria



Description:

Ruth's sphaeromeria is an aromatic subshrub that may grow up to 5 dm tall. The leaves are canescent-tomentose, which is a diagnostic character separating it from *Sphaeromeria diversifolia*. The leaves are up to 25 mm long and pinnately lobed, with very narrow segments. The upper leaves often have entire margins. The flowering heads are arranged in paniculate inflorescences. The involucre bracts are up to 5 mm long. The yellow corollas are up to 2 mm long and appear in September. The achenes are ribbed and may be glabrous and resinous. A pappus is lacking.

Habitat and range: *Sphaeromeria ruthiae* is a narrow endemic, growing in rock crevices in ponderosa pine and mountainbrush communities in Kane and Washington cos., at 1340–2000 m.

Comments: *Ruthiae* honors Ruth Ashton Nelson, a 20th-century naturalist who specialized in the flora of the Rocky Mountains and was the wife of botanist Aven Nelson.

***Tetradymia* DC.**

Tetradymia means “having four together,” referring to the 4-flowered heads of the first-known species of the genus. Many species in this genus contain alkaloids that can be poisonous to livestock.

***Tetradymia axillaris* A. Nelson, Longspine horsebrush**

Description: Longspine horsebrush grows up to 1.2 m tall, with robust stems bearing stout, sharp spines. The spines (primary leaves) are up to 5 cm long and may be initially tomentose, but eventually become glabrous. The secondary leaves appear early in the axils of the spine and are linear to spatulate, up to 12 mm long, very narrow, and essentially glabrous. The flowering heads are borne singly, or in twos or threes. The involucre is up to 11 mm long, with 5 tomentose floral bracts. The flowers are pale yellow and bloom in the spring. The corolla tubes are up to 9 mm long. The achenes are up to 5.5 mm long and pilose at maturity, with a pappus of slender bristles.

Habitat and range: Longspine horsebrush occurs in Mojave Desert shrub and salt desert shrub communities in Washington Co., at 850–1375 m. It is also found in California and Nevada.



Comments: The *Flora of North America*, vol. 20, recognizes two varieties that occur in Utah. *Tetradymia axillaris* var. *axillaris* is distinguished from *T. axillaris* var. *longispina* (M. E. Jones) Strother by having glabrous peduncles and phyllaries and shorter hairs on the achenes. These varieties are also separated by habitat: var. *longispina* occurs at 600–1800 m, and var. *axillaris* grows at 1200–2300 m. Both varieties are Mojave Desert taxa. Native Americans used the sharp spines for tattooing needles. *Axillaris* refers to the leaf axils.

***Tetradymia canescens* DC., Gray horsebrush**



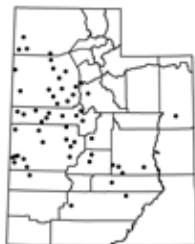
Description: Gray horsebrush may be up to 9 dm tall on favorable sites. The stems are without spines, white, and have a dense tangle of very short tomentose pubescence. Narrow glabrous strips run along the stem below each primary leaf. The leaves are tomentose and linear or linear-lanceolate, up to 4 cm long and 6 mm wide. The axillary leaves are similar to the primary leaves, but shorter and narrower. The flower heads are solitary or few, borne on the ends of the stems. The involucre is up to 8 mm long, with 4 subequal tomentose bracts. The flowers are yellow, usually 4 per head, up to 11 mm long, and appear in April–June. The achenes are up to 5 mm long, may be glabrous or hairy, and bear a pappus of white or tawny bristles.

Habitat and range: Gray horsebrush grows in xeric sagebrush, Colorado Plateau shrub, mountainbrush, ponderosa pine, and aspen-mixed conifer communities in all parts of Utah, at 1525–3150 m. It is also known from much of the western United States and British Columbia.

Comments: *Tetradymia canescens* is a beautiful shrub, with showy yellow flowers. It is tolerant of drought and frost and should be considered for landscaping. *Canescens* means “gray pubescent.”

***Tetradymia glabrata* Torr. & A. Gray, Littleleaf horsebrush**

Description: Littleleaf horsebrush is a shrub that grows up to 1.2 m tall. The stems are densely tomentose, with very short white hairs. Glabrous or brownish streaks run down the stem below primary leaves. The leaves are up to 15 mm long and 4 mm wide, linear or spinose, with a sharp tip. The primary leaves soon drop, and the axillary leaves become the main photosynthetic units. The secondary (axillary) leaves are linear or thinly spatulate and glabrous or weakly tomentose. The flowering heads are solitary or few, borne at the stem tips. The involucre is up to 10 mm long. There are 4 bracts and 4 yellow flowers per head. The corollas are up to 10 mm long and appear in May–June. The achenes are up to 5 mm long, hirsute, and topped by a pappus of white bristles.



Habitat and range: Littleleaf horsebrush grows in salt desert shrub, xeric sagebrush, sagebrush-grass, and pinyon-juniper communities throughout Utah, at 1360–2370 m. It is also known from California, Idaho, Nevada, and Oregon.

Comments: *Tetradymia glabrata* is the most toxic of all *Tetradymia* species and unpalatable to livestock and wildlife, particularly sheep. It resprouts from the root crown after fires and increases with heavy grazing. *Glabrata* means “smooth” or “without hairs.”

***Tetradymia nuttallii* Torr. & A. Gray, Nuttall's horsebrush**



Description: Nuttall's horsebrush grows up to 1.2 m tall on favorable sites. The stems are white when young, due to a short tomentum. As with other species in the genus, there is a narrow glabrous streak that runs downward beneath each primary leaf. The primary leaves are usually reduced to persistent straight or recurved spines, up to 25 mm long. The

flowering heads appear in crowded terminal clusters. Each head has 4 yellow flowers, with corollas up to 10 mm long that appear in late May–early June. The involucre is up to 9 mm long, with 4 bracts per head. The achenes are up to 6 mm long and hirsute, with a white or straw-colored pappus of bristles.

Habitat and range: Nuttall’s horsebrush grows in xeric sagebrush, salt desert shrub, sagebrush-grass, and pinyon-juniper communities. It grows across northern Utah and in all western Utah counties as far south as Millard Co., at 1370–1830 m. It is also known from Nevada and Wyoming.

Comments: *Tetradymia nuttallii* is the least toxic species of the genus *Tetradymia*, but it is not palatable to wildlife and livestock. *Nuttallii* is named after Thomas Nuttall, a 19th-century English botanist and ornithologist who lived and worked in America for over 30 years.

***Tetradymia spinosa* Hook. & Arn., Spiny horsebrush**



Description: Spiny horsebrush grows up to 1.2 m tall on favorable sites. The stems are whitened by a short tomentum. The primary leaves are modified as sharp stiff spines up to 20 mm long. The secondary leaves are linear or narrowly spatulate, up to 18 mm long, and glabrous. The flowering heads develop laterally on second-year stems and appear singly or in pairs. The heads have up to 8 yellow flowers. The corollas are up to 10 mm long and bloom in April–June. The achenes are up to 8 mm long and hairy, with pubescence that is as long as or longer than the achene.

Habitat and range: Spiny horsebrush grows in xeric sagebrush, sagebrush-grass, and pinyon-juniper communities throughout Utah at 1250–1925 m. It is also known from California, Colorado, Montana, Nevada, New Mexico, Oregon, and Wyoming.

Comments: *Tetradymia spinosa* is less toxic than others in the genus, but it is not palatable to livestock and wildlife. It is rhizomatous and tends to form colonies. *Spinosa* means “having spines.”

***Thymophylla* Lag.**

Thymophylla means “perfumed leaf.”

***Thymophylla acerosa* (DC.) Strother, Dogweed**



Description: Dogweed is an aromatic subshrub that grows to 25 cm tall, with stems that are woody only at the base. The leaves are mostly opposite and aromatic due to depressed oil glands, up to 18 mm long and 2 mm wide, and may be trifid at the tip, but not lobed. The leaf surfaces are glabrous or villous. The flowering heads are sessile or subsessile, with turbinate or cylindric involucre up to 7 mm long and 4 mm wide. The bracts, up to 8 in number, are yellow. Each head produces up to 25 pale yellow disk flowers that appear in April–June. The achenes are up to 3.5 mm long, dark brown, and strigose, with a pappus of up to 20 scales, each of which is divided into 3–5 bristles.

Habitat and range: Dogweed grows in Mojave Desert shrub and Colorado Plateau shrub communities and prefers calcareous outcrops and gypsiferous soils. It is known from Garfield, Kane, San Juan, and Washington cos., at 1130–1450 m. It is also known from Arizona, New Mexico, Texas, and Mexico.

Comments: A related species, *Thymophylla pentachaeta* var. *belenidium* (DC.) Strother, often is intermixed with *T. acerosa* in Utah, but the former is not shrubby and its leaves are usually lobed. *Acerosa* means “needle-like.”

***Xylorhiza* Nutt.**

Xylorhiza means “hard or woody root.” Members of this genus are usually indicators of selenium soils. The ray flowers are pistillate and fertile.

***Xylorhiza confertifolia* (Cronquist) T. J. Watson, Henrieville woodyaster**

Description: Henrieville woodyaster is a small subshrub, with a woody caudex, that may grow up to 25 cm tall at maturity. The stems are glabrate to thinly pilose and usually stipulate glandular. The leaves are up to 4.5 cm long and 2.5 mm wide, linear, and glabrate to pilose, with involute and somewhat toothed margins. The flowering heads are borne on peduncles up to 14 cm long. The involucre is up to 12 mm long and 18 mm wide, with bracts that are lanceolate, pilose or glabrate, and often glandular. The flower heads have up to 12 white ray flowers that are up to 18 mm long and 4 mm wide. The disk flowers are yellow, up to 9 mm long, and appear in May–July. The achenes are pubescent, up to 6 mm long, and topped by a capillary pappus that may be up to 6.5 mm long.

Habitat and range: Henrieville woodyaster grows in xeric sagebrush, Colorado Plateau shrub, and pinyon-juniper communities, on alkaline clay soils in Garfield and Kane cos., at 1675–2125 m.

Comments: *Xylorhiza confertifolia* is a narrowly distributed endemic species. *Confertifolia* means “with crowded leaves.” Henrieville woodyaster is of conservation concern.

***Xylorhiza cronquistii* S. L. Welsh & N. D. Atwood, Cronquist’s woodyaster**

Description: Cronquist’s woodyaster is a subshrub that may grow up to 30 cm tall. The stems are woody only at the base, numerous, and white villous at the nodes but merely glabrate elsewhere. The leaves are up to 5 cm long and 5 mm wide, linear lanceolate, with serrate-dentate or entire margins and prominent midribs, and thinly covered with villous pubescence. The flower heads are solitary at the branch tips. The involucre is up to 12 mm long and 19 mm wide. The bracts are lance-attenuate

or oblanceolate, with acute to attenuate tips, and are glandular dorsally. The flowering heads have up to 16 white ray flowers that are up to 25 mm long and bloom in June–July. The achenes are up to 7.2 mm long, villous, and compressed. The pappus consists of capillary hairs that are up to 7 mm long.



Photo by Photo by Walt Fertig

Habitat and range: Cronquist's woodyaster grows in pinyon-juniper communities in Garfield and Kane cos., at 1464–2075 m. It is a narrow endemic of the gray silts of the Tertiary Kaiparowits Formation and the mudstones of the Triassic Chinle Formation.

Comments: *Xylorhiza cronquistii* is most likely an intermediate between *X. confertifolia* and *X. imberbis*. *Cronquistii* is named after Arthur Cronquist, a 20th-century American botanist and developer of a new system of taxonomic classification. Cronquist's woodyaster is of conservation concern.

***Xylorhiza glabriuscula* Nutt., Smooth woodyaster**

Description: Smooth woodyaster is a subshrub that grows up to 3.5 dm tall. The stems are woody at the base, glabrous or villous, and leafy to above their midpoint. The leaves are alternate, up to 7.5 cm long and 9 mm wide, lanceolate to narrowly oblong, and varying from glabrate to villous. The flower head appears singly at the stem tips, with involucre up to 14 mm tall and 27 mm wide. The bracts are lanceolate, attenuate to acute, and herbaceous at their tips but scarious below. The bracts vary from glabrate to villous. The flowering heads have up to 22 ray flowers that are white, up to 20 mm long, and appear in late May–early July. The achenes are compressed and villous, with a pappus of capillary bristles up to 5 mm long.



Photo by Walt Fertig

Habitat and range: Smooth woodyaster grows in salt desert shrub communities on the Mancos Shale Formation in Daggett Co., at 1525–2135 m. It also occurs in Colorado, Montana, South Dakota, and Wyoming.

Comments: *Xylorhiza glabriuscula* spreads by underground runners. *Glabra* means “glabrous” or “smooth” and *cula* means “little.”

Xylorhiza linearifolia (T. J. Watson) G. L. Nesom, Moab woodyaster



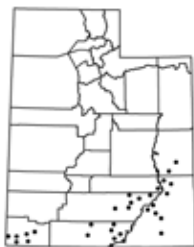
Description: Moab woodyaster is a subshrub, growing up to 35 cm tall. The stems are puberulent to coarsely stipitate glandular. The leaves are linear oblong to linear lanceolate, with truncate or rounded-auriculate bases, and stipitate glandular. The leaf margins are flat and usually entire, rarely few-toothed. The involucre are 10–17 mm long and 15–30 mm

wide. The heads are borne singly on naked peduncles. The 10–22 ray flowers are bluish, purplish, or white and bloom in April–May.

Habitat and range: Morphologically, *Xylorhiza linearifolia* is similar to *X. glabriuscula*, but instead is found in Garfield, Grand, San Juan, and Wayne cos. in Utah, at 1300–2000 m. It is a local endemic, occurring mainly on sands and clays of the Triassic Chinle, Shinarump, and Moenkopi formations.

Comments: The *Flora of North America*, vol. 20, suggests that plants with few-toothed leaf margins may be a result of hybridization with *Xylorhiza tortifolia*. *Linearifolia* refers to the linear leaves. Moab woodyaster is of conservation concern.

***Xylorhiza tortifolia* (Torr. & A. Gray) Greene**



Two varieties are recognized in Utah.

***Xylorhiza tortifolia* var. *imberbis* (Cronquist) T. J. Watson, Smooth Mojave woodyaster**

Description: Smooth Mojave woodyaster is a subshrub that may grow up to 50 cm tall. The stems are glabrous, with stipitate glands. The leaves are lanceolate to elliptic-oblong or oblanceolate, up to 10 cm long and 2 cm wide. The leaf blades are mostly glabrous, with margins that are sparsely pilose-villous to puberulent and spiny dentate. The flowering heads appear at the stem tips. The involucre is stipitate glandular and up to 2 cm long and 3 cm wide. The bracts are narrowly lanceolate to acuminate, herbaceous above and glandular below. The heads have up to 60 ray flowers that are purplish to rarely white, up to 33 mm long and 6 mm wide, and bloom in April–June. The achenes bear a pappus of capillary bristles up to 9 mm long.

Habitat and range: This variety prefers the sandy or gravelly slopes and flats of the Colorado River canyons. It grows in Colorado Plateau shrub, pinyon-juniper, and sagebrush-grass communities in Garfield, Grand, Kane, San Juan, and Wayne cos., at 1220–2290 m. Smooth Mojave woodyaster also occurs in adjacent areas of Arizona and Nevada.

Comments: *Imberbis* means “without beards or spines.”

***Xylorhiza tortifolia* var. *tortifolia*, Mojave woodyaster**

Description: Mojave woodyaster differs from *Xylorhiza tortifolia* var. *imberbis* primarily in its leaves, which are villous and glandular, rather than glabrous and glandular. The stems and involucre of var. *tortifolia* are pilose villous to puberulent, and finely stipitate glandular rather than glabrous, as in var. *imberbis*.



Habitat and range: This variety occurs in Mojave Desert shrub communities in Washington Co., at 760–1010 m. It also is found in Arizona, California, and Nevada.

Comments: Mojave woodyaster is a food plant for Neumoegen's checkerspot, a common desert butterfly. *Tortifolia* means "twisted leaves."

Xylorhiza venusta (M. E. Jones) A. Heller, Cisco woodyaster



Description: Cisco woodyaster is a subshrub that grows up to 4 dm tall. The stems are densely villous-puberulent to glabrate, without glands. The leaves are up to 9 cm long and 1.7 cm wide, oblanceolate to spatulate, and villous to glabrate. The flowering heads are produced at the ends of the peduncles, which are up to 20 cm long. The involucre is up to 18 mm long and 50 mm wide. The bracts are lance-attenuate to caudate acuminate, herbaceous above and scarious below, and have villous hairs, with short crinkled trichomes. The ray flowers are white or bluish to purple, number 12–36, and bloom in late April–June.

Habitat and range: Cisco woodyaster grows on barren sites dominated by saltbush and shadscale. It occurs in saline, fine-textured, seleniferous soils of the Mancos Shale and Morrison formations in Carbon, Daggett, Duchesne, Emery, Garfield, Grand, San Juan, Uintah, and Wayne cos., at 1250–1985 m. *Xylorhiza venusta* is endemic to the Colorado Plateau and also grows in Colorado.

Comments: *Venusta* means “handsome” or “charming.”



BERBERIDACEAE—Barberry family

Most species in the barberry family are shrubs that occur in temperate regions. Many have spines, or leaves with spiny margins. Members of this family have alternate leaves that are usually compound. The fruit is a berry that may be used in jams and jellies. The plants have been used for natural dyes, due to a yellow compound (berberine) that is produced in the wood and inner bark, and are commonly used as ornamentals. Some species are alternate hosts of the fungus *Puccinia graminis* (black stem wheat rust). There are three woody species native to Utah.

***Berberis* L.**

Berberis is Arabic for “barberry.”

***Berberis fendleri* A. Gray, Fendler’s barberry**

Description: Fendler’s barberry is a deciduous shrub that grows up to 1 m tall. The bark of younger stems is reddish brown and lustrous. The primary leaves are modified as 3–5-parted spines, up to 1.5 cm long. The leaves are alternate, simple, and up to 6 cm long and 1.4 cm wide, oblanceolate to spatulate, with entire to spinulose serrate margins. The flowers, borne in racemes of 2–10 flowers, with pedicels up to 6 cm long, are white and bloom in May–August. The fruit is an elliptical or ovoid berry, up to 7 mm in diameter, and red at maturity.

Habitat and range: *Berberis fendleri* occurs in riparian corridors in pinyon-juniper, mountainbrush, ponderosa pine, and Douglas fir communities in Grand and San Juan cos., between 1585 and 2300 m. It also grows in Colorado and New Mexico.

Comments: *Fendleri* honors August (Augustus) Fendler, a prolific 19th-century German-born professional plant collector.

***Berberis fremontii* Torr., Frémont’s barberry**

Description: Frémont’s barberry is an attractive shrub that grows up to 3 m tall on favorable sites. The leaves are evergreen, glaucous, pinnately

compound, and up to 11 cm long and 7 cm wide. There are up to 9 leaflets that are up to 3 cm long and 3 cm wide, with 5–7 triangular lobes, each tipped with a spine. The flowers are borne in racemes or umbel-like clusters, with up to 9 flowers per cluster. The sepals are up to 5 mm long. The petals may be up to 8 mm long, are bright yellow, and bloom in April–early July. The fruits are red or purple berries, up to 2 cm long, and have an outer pericarp that is fleshy and tart.

Habitat and range: Frémont's barberry occurs all across the southern counties of Utah, at 820–2380 m, in Mojave Desert shrub, Colorado Plateau shrub, salt desert shrub, pinyon-juniper, and mountainbrush communities. It is also known from Arizona, Colorado, Nevada, and New Mexico.

Comments: The flowers of *Berberis fremontii* are very fragrant. *Fremontii* honors John Charles Frémont, a naturalist and early explorer of the American West.

Berberis repens Lindl., Creeping barberry



Description: Creeping barberry is an evergreen shrub that grows up to 3 dm tall. The compound-pinnate leaves are up to 25 cm long and 15 cm wide, with up to 7 leaflets. The individual leaflets are ovate, unequally lobed at the base, and have spinulose-tipped teeth along the margins. The sepals are up to 3 mm long. The petals are up to 8 mm long, deep yellow, and 2 lobed. The flowers bloom in April–June. The berries are up to 10 mm long and blue glaucous when mature.

Habitat and range: Creeping barberry occurs in all Utah counties, at 1125–2980 m, and is very common in woodlands and forests. It is known from much of the western and northern United States and western Canada.

Comments: *Berberis repens* is good ground cover in landscapes and reclamation areas, as it recovers well from fires and clear cutting; however, it does not compete well with other plants. *Repens* means “creeping” or “crawling.”

BETULACEAE—Birch family

The birch family consists of mostly deciduous trees and shrubs that occupy cool temperate and boreal zones of the Northern Hemisphere. The members of this family produce male flowers in catkins and female flowers in spikes, clusters, or catkins. Most are wind pollinated. The fruit is a nut or nutlet and many are edible (e.g., hazelnut). The plants are important ecologically, as they stabilize soils and streambanks. They form symbiotic relationships with nitrogen-fixing bacteria that provide available nitrogen to both terrestrial and aquatic systems. The plants also provide food and habitat for many avian and mammal species. They are also important ornamentals. In Utah, there are four native woody species.

***Alnus* Mill.**

Alnus is Latin for “alder.”

***Alnus incana* (L.) Moench, Thinleaf alder**

Description: Thinleaf alder is a handsome plant that grows up to 10 m tall, with gray to brownish bark. The twigs are minutely hairy and, commonly, glandular. The alternate leaves are simple, pinnately veined, up to 9 cm long and 6.5 cm wide, obtuse or subcordate basally, and ovate or elliptical, with doubly serrate or shallowly lobed margins. The lower surface of the leaf is paler than the upper surface. The leaf petioles are up to 2 cm long. The pistillate inflorescence consists of an axis with thickened bracts that become woody and cone-like, which is up to 15 mm long and blooms in March–May. At maturity the “cones” open to release small winged seeds, and these woody cone-like structures persist on the tree for at least another year.

Habitat and range: Thinleaf alder is common in riparian and seep or spring environments throughout Utah, at 1250–2745 m. It is also known

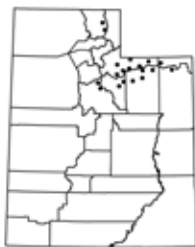
from Alaska to Nova Scotia and southward to Pennsylvania, New Mexico, and California. It is also reported from Eurasia.

Comments: Thinleaf alder is ecologically important for streambank stability and for the nitrogen-fixing bacteria in its root nodules. Our plants belong to *Alnus incana* subsp. *virescens* S. Watson. *Incana* means “gray or white with age” and *virescens* means “turning green.”

Betula L.

Betula is Latin for “birch.”

***Betula glandulosa* Michx., Bog birch**



Description: Bog birch is a shrub, up to 1.2 m tall on some sites, with 1 to several stems at ground level. The bark is brown or purplish and produces conspicuous yellowish resin glands on younger twigs. The leaves are simple, pinnately veined, up to 2.5 cm long and 2 cm wide, round or ovate, with acute tips, cuneate or rounded basally, and have crenate to serrate margins, with 10 teeth per side. The leaves are not hairy, but they may have minutely hairy margins. The petioles are up to 9 mm long. The male catkins are long, flexible, and short lived. The female flowers are borne in short thickened inflorescences that persist for months after the winged seeds mature and are dispersed. The flowers bloom in late spring.

Habitat and range: Bog birch grows in meadows, acidic marshes, and along streambanks in aspen-mixed conifer and spruce-fir communities. It occurs in the northern counties of Utah, at 2500–3350 m. *Betula glandulosa* is common in much of the northwestern United States and Canada, and it is also known from Asia.

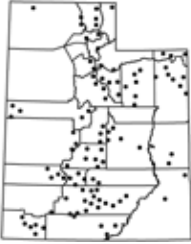
Comments: *Glandulosa* means “prone to having glands.”



***Betula occidentalis* Hook., Western river birch**

Description: Western river birch is a multistemmed tree that may be up to 6 m tall. The bark is reddish or yellowish brown, shiny, with light-colored, sunken, horizontal lenticels, and shows little exfoliation. The leaves are simple and broadly ovate, up to 5 cm long and equally wide, with abrupt acute to acuminate tips and margins that are doubly serrate, having

up to 25 teeth per side. The leaf surfaces are glabrous, except for some hairs along the margins. The petioles are up to 15 mm long and glabrous or pubescent. The staminate catkins are pendulous, up to 3.5 cm long, and appear before the leaves. The female catkins are up to 4 cm long and 1 cm wide, with bracts that are ciliate and puberulent. The flowers appear in April–June. The fruit is a samara, with a wing about as wide as the nutlet. The catkins disintegrate at maturity, and the individual nutlets are widely dispersed by the wind.



Habitat and range: Western river birch grows along stream edges and the margins of seeps, between 1220 and 2685 m in Utah. It is also known from Alaska southward to South Dakota, Colorado, and California.

Comments: *Betula occidentalis* tolerates flooding and maintains streambanks. It is an important source of wood for beaver dams. It is also a useful landscape tree. *Occidentalis* means “western.”

***Ostrya* Scop.**

Ostrya is Greek for “hardwood trees.”

***Ostrya knowltonii* Coville, Western hophornbeam**

Description: Western hophornbeam is a beautiful small tree, growing up to 6 m tall, and commonly has several stems at ground level. The stems may be up to 18 cm thick, with branchlets that are spreading hairy and have stipitate glands. Older stems are hairless. The leaves are simple, alternate, doubly serrate, up to 8 cm long and 5 cm wide, ovate to elliptic, rounded to obtuse basally, and acute apically. The staminate catkins appear before the leaves, and are pendulous and up to 6 cm long. The female catkins are up to 5 cm long, greenish to white, and persistent until the seeds mature. The flowers bloom in late spring. The fruit is a hop-like, compressed, ovoid nutlet.

Habitat and range: Western hophornbeam grows in shaded canyon bottoms and hanging gardens. It is found in Garfield, Grand, Kane and San Juan cos., at 1225–1710 m. It also occurs in Arizona, New Mexico, and Texas.



Comments: *Ostrya knowltonii* is not common in Utah. The wood is very dense. *Knowltonii* honors Frank Hall Knowlton, a mid-19th- to early 20th-century American paleobotanist.



BIGNONIACEAE—Catalpa family

Members of the catalpa family are mostly trees, shrubs, and vines that are important associates in tropical forests. They usually have opposite or whorled leaves. The flowers are showy, have superior ovaries, and are pollinated by insects, birds, and bats. Most plants produce fruits that are bean-like and split lengthwise, with winged seeds. Some species are used for landscaping, such as yellow-trumpet flower, jacaranda, and catalpa. Only one woody species is native to Utah.

***Chilopsis* D. Don**

Chilo refers to the lip-like shape of the calyx.

***Chilopsis linearis* (Cav.) Sweet, Desert willow**

Description: Desert willow may grow to up 6 m or more tall on favorable sites. It has one to several stems near the ground. The twigs are gently ascending, may be glabrous or woolly, and lack terminal buds. The willow-like leaves are alternate to almost opposite at the lower nodes, 8–20 cm long and about 1 cm wide, glabrous, and often sticky. The flowers are sympetalous, 2-lipped, and white, with purple streaks and spots. The flowers are up to 5 cm long, sweetly scented, and borne in narrow panicles or racemes, blooming in May–July. The fruits are cylindrical capsules.

Habitat and range: Desert willow is found along washes, stream courses, and terraces in Washington Co., below 1500 m. It also occurs in Arizona, California, Nevada, New Mexico, and Texas.

Comments: *Chilopsis linearis* is commonly used as a landscape ornamental. A waxy coating on the leaves retards water loss. The roots can grow up to 50 feet long. Hummingbirds feed on the nectar of the showy flowers. It is pollinated by large black carpenter bees and hawk moths. *Linearis* refers to the linear leaves.



BORAGINACEAE—Borage family

The borage family is made up of annual, biennial, and perennial herbs and shrubs that are distributed worldwide. They have simple or compound leaves that are often hairy or glandular. The inflorescence is usually a scorpioid cyme, with flowers that are perfect, hypogynous, and 5 merous. The petals are usually fused. The fruit types include schizocarps, drupes, and capsules. Some species are used as ornamentals, such as baby blue eyes (*Nemophila*), fiestaflower (*Pholistoma*), and *Phacelia*. Utah has only one native woody species, *Eriodictyon angustifolia*. The family Hydrophyllaceae is included here within the family Boraginaceae.

Eriodictyon Benth.

Erio means “wool” and *dictyon* means “net.”

Eriodictyon angustifolium Nutt., Yerba Santa



Description: Yerba Santa is an evergreen aromatic shrub that sometimes grows up to 2 m tall. The leaves are alternate, glutinous, and linear, up to 15 cm long and 1.2 cm wide, thick, and with revolute margins that are entire or toothed. The inflorescences are terminal, cymose, and scorpioid. The petals are white, narrowly campanulate, and up to 6 mm long. Flowering is in June–July. The stamens are included within the petals, and the style is divided to its base. The fruit is a capsule containing up to 6 seeds.

Habitat and range: Yerba Santa grows in Mojave Desert shrub, mountainbrush, pinyon-juniper, and lower elevation riparian communities. It occurs in Washington Co., at 730–2150 m, and in adjacent Arizona and Nevada.

Comments: *Eriodictyon angustifolium* sprouts vigorously following fire. *Angustifolia* means “narrow leaf.” The common name, “Yerba Santa,” means “sacred herb.”



BRASSICACEAE —Mustard or cabbage family

The mustard family consists mostly of herbaceous species, with only a few woody representatives. Its general characteristics include flowers with 4 separate petals, 6 stamens (4 long, 2 short), a superior ovary, alternate leaves or basal rosettes, and fruits that are siliques or silicles. Most of the taxa produce glycosinolate compounds known as mustard oils, which have a pungent odor. Species within this family have been selectively bred to produce many food crops, such as cabbages, cauliflowers, turnips, radishes, brussels sprouts, and the like. The plants have also been used for spices, salad greens, and ornamentals. Many members of this family are considered serious weeds, such as whitetop (*Cardaria*), dyer's woad (*Isatis*), and others that crowd out and replace native annuals. Most mammals and birds avoid this family as a source of food. Utah has five native woody species in two genera.

***Lepidium* L.**

Lepidium means “little scale,” referring to the shape of the fruit pods

***Lepidium fremontii* S. Watson, Frémont's pepperplant**

Description: Frémont's pepperplant is a subshrub that may grow up to 8 dm tall and is often only woody for a few centimeters above the soil. The stems are glabrous and glaucous. The leaves are alternate, up to 5 cm long, and pinnatifid, with narrow lobes that are acutely tipped and up to 2 mm long. The bracts up to 2 cm long, often subtending the inflorescence. The sepals are up to 2.5 mm long. The petals are white and up to 5 mm long. The flowers bloom in April–July. The fruits are silicles, up to 7.5 mm long and almost as wide, hairless, and notched apically.

Habitat and range: Frémont's pepperplant grows in Mojave Desert shrub and other warm desert communities in Washington Co., at 700–1525 m. It also grows in Arizona, California, and Nevada.

Comments: The crushed foliage of *Lepidium fremontii* smells like cabbage or broccoli. This plant is one of the earliest of the spring wildflowers to bloom. *Fremontii* honors John Charles Frémont, a naturalist and early explorer of the American West.

***Lepidium huberi* S. L. Welsh & Goodrich, Huber's pepperplant**



Photo by Sherel Goodrich

Description: Huber's pepperplant may grow up to 7.5 dm tall. The stems are minutely pubescent below. The cauline leaves are up to 5.5 cm long and pinnatifid, with linear lobes up to 2 mm wide. The upper leaves are often simple and lack auricles. The inflorescence bracts are up to 1.5 cm long and linear. The pedicels of the inflorescence are up to 4.5 mm long, ascending and spreading. The flowers bloom in late July–August. The sepals are green, up to 2 mm long, and have white margins. The petals are up to 2.6 mm long, yellowish, glabrous, and notched apically. The fruits are siliques, up to 2.6 mm long, glabrous, and notched apically.

Habitat and range: Huber's pepperplant grows in sagebrush-grass, mountainbrush, ponderosa pine, Douglas fir, and lodgepole pine communities. In Utah, it is known only from Uintah Co., at 2225–2960 m. It also occurs in western Colorado.

Comments: *Lepidium huberi* is a rare endemic, of conservation concern. *Huberi* is named after Allen Huber, a present-day Utah botanist. Huber's pepperplant is of conservation concern.

***Lepidium montanum* Nutt., Mountain pepperplant**

Mountain pepperplant grows more typically as a perennial or biennial herb, but one variety in Utah is somewhat woody.

***Lepidium montanum* var. *jonesii* (Rydb.) C. L. Hitch., Jones' pepperplant**

Description: Jones' pepperplant grows up to 6 dm tall, with a woody caudex. The stems are glabrous. The basal leaves are poorly developed and often absent at flowering. The white flowers occur in racemes and bloom in late spring–summer. The fruits are ovate to suborbicular silicles, with a slightly notched winged apex.

Habitat and range: Jones' pepperplant is found in salt desert shrub, xeric sagebrush, and pinyon-juniper communities throughout eastern and central Utah, at 850–2135 m. It is the most widely distributed variety of the species, and it also occurs in Arizona, Colorado, and Nevada.

Comments: *Lepidium montanum* var. *jonesii* is often confused with *L. fremontii*. *Jonesii* is named after Marcus Eugene Jones, a mid-19th- to early 20th-century American botanist and early collector in the western United States.

Stanleya Nutt.

Stanleya is named after Lord Edward Stanley, a 19th-century English ornithologist.

***Stanleya pinnata* (Pursh) Britton, Desert plume**



Description: Desert plume grows up to 1.2 m tall. The stems are mostly woody, with surfaces that are glabrous to pilose. The leaves are all cauline, glaucous, up to 1.8 dm long and 5 cm wide, and pinnatifid.

The upper leaves may be entire and lanceolate or elliptic. The leaf surfaces are glabrous or sparsely pilose. The sepals are up to 22 mm long, spreading and reflexed. The petals are yellowish, up to 17 mm long and 3.8 mm wide. The flowers bloom in April–August. The fruits are siliques, up to 7 cm long and 2 mm wide, rounded or somewhat flattened, with a basally puberulent stripe.

Habitat and range: Desert plume grows in salt desert shrub, xeric sagebrush, Colorado Plateau shrub, pinyon-juniper, and mountainbrush communities. It is found on fine-textured soils that are derived from many different geological

formations and are often seleniferous. It occurs in most Utah counties, at 915–2290 m, and throughout the central and western United States.

Comments: The high selenium content in the leaves of *Stanleya pinnata* may make them poisonous, and they should not be eaten. *Pinnata* means “feather-like or pinnate.”



CACTACEAE—Cactus family

The cactus family is native to the Americas and is most common in semiarid habitats. Most members have green fleshy stems, with areoles usually bearing 1 or more spines. The leaves are usually absent or short lived, as an adaptation to reduce water loss. The flowers often have similar-looking petals and sepals that are referred to as “tepals.” They also have numerous stamens and inferior ovaries. Solitary bees are the primarily pollinators of cacti; however, moths, birds, and bats may also be pollinators. In addition to their reduced leaves, cacti have other adaptations to their arid environments, such as spines that shade and protect the fleshy stems, a waxy coating (cuticle) on the stem surface to reduce transpiration, extensive and shallow root systems that take advantage of intermittent precipitation, and a modified photosynthetic pathway known as Crassulacean Acid Metabolism (CAM) that allows for gas exchange to occur at night, thus reducing water loss. Cacti are of interest as ornamentals. Many parts of the plants are eaten as food. Some members of this family have medicinal uses (such as peyote and *Opuntia*). Many have become endangered due to overcollection, habitat disturbance by recreational vehicles and grazing, and habitat loss due to urban or industrial development. In Utah, Cactaceae has the second largest number of native woody species (36).

***Coryphantha* (Engelm.) Lem.**

Coryphantha means “flowering on the top.”

***Coryphantha chlorantha* (Engelm.) Britton & Rose, Mojave pincushion**

Description: Mojave pincushion is single stemmed or less often branched, spheric to short cylindric and grows up to 15 cm tall and to 9.5 cm wide. The stems are erect and densely covered with spines that converge over the plant’s apex. There are up to 41 spines per areole. There are up to 13 central spines that are up to 21 mm long with some that are extended forward or ascending, usually white to pinkish, sometimes straw-colored, very light near the base and becoming darker toward the tips. Spine color fades with age. Radial spines are white. The flowers are produced near the stem apices, are up to 4.4 cm long with inner tepals up to 2.8 mm wide and bloom in April–June. The tepals have fringed margins. The inner tepals are pale greenish or light yellowish orange and many bear a dark pink or dark midstripe. The anthers are orange or yellow. The fruits are ellipsoidal or ovoid, up to 11 mm in diameter, pale green, sometimes becoming light rose pink, and succulent at maturity. Seeds are red-brown and up to 1.8 mm long.

Habitat and range: Mojave pincushion grows in Mojave Desert shrub and pinyon-juniper communities in Washington Co., at 760–980 m, and in Arizona, California, and Nevada.

Comments: Without flowers, *Coryphantha chlorantha* is difficult to distinguish from *C. vivipara*. *Coryphantha chlorantha* has spines that are usually more dense and more ascending. The flowers are paler, shorter, and narrower

than those of *C. vivipara*, and never pure pink. *Coryphantha chlorantha* also grows in hotter, drier places. *Chlorantha* means “green flowered,” referring to the green morph (variant) that was used to name the species.

***Coryphantha missouriensis* (Sweet) Britton & Rose, Missouri pincushion**



Description: Missouri pincushion has depressed, hemispheric, simple, usually solitary stems that are up to 8 cm tall and 7.5 cm wide. The stems are covered with separate tubercles up to 21 mm long, and areoles that produce up to 20 radial spines. The flowers are up to 5 cm wide, with tepals that are pale greenish yellow, with greenish-brown midstripes, or rose pink, with pale brown midstripes, and bloom in April–June. The filaments are pinkish, greenish-white, or white. The anthers are yellow. The stigmas are green or yellow. The bright red fruits are up to 1 cm thick, may have tufts of dried flowers on them, and produce seeds that are black and up to 2.2 mm wide.

Habitat and range: Missouri pincushion is rare in Utah and grows in Colorado Plateau shrub, pinyon-juniper, and ponderosa pine communities in Garfield and Kane cos. It also occurs in adjacent Arizona and from Montana to North Dakota and southward to Texas and New Mexico.

Comments: *Coryphantha missouriensis* becomes nearly subterranean during winter. The conspicuous red fruits offer the easiest feature by which to find them, since the plants are small and the flowers pale and relatively inconspicuous. The flowers and fruit may coexist. *Missouriensis* means “of Missouri.”

***Coryphantha vivipara* (Nutt.) Britton & Rose, Pincushion cactus**



Photo by Jim Harris

Description: Pincushion cactus has solitary or colonial stems that are depressed and hemispheric to short cylindric, up to 15 cm tall and 10 cm wide. The areoles bear up to 32 spines with up to 12 central spines that are white basally, have dark tips, and are up to 20 mm long. The flowers are up to 5 mm wide with fringed outer tepals and bloom in June. The inner tepals are up to 6 mm wide and are pink to red-violet. The anthers are yellow. The fruits are elliptical, green, red or orange, succulent at maturity, and up to 25 mm long. The seeds are brown, reticulate, and up to 2 mm wide.

Habitat and range: *Coryphantha vivipara* is widespread but scattered over much of the state in the Great Basin and the Colorado drainage, at 1586–2440 m. It is also found in Arizona, Nevada, and much of the mid-western United States, as well as in Canada and Mexico.

Comments: The flowers of pincushion cactus open at noon in response to photoperiod. *Vivipara* means “bearing plantlets or bulblets of the plant.”

***Cylindropuntia* (Engelm.) F. M. Knuth**

Cylindro means “cylinder shaped” and *opuntia* is Greek for “spiny plant.”

***Cylindropuntia acanthocarpa* (Engelm. & J. M. Bigelow) F. M. Knuth, Buckhorn cholla**

There are four varieties of this species but only one, var. *coloradoensis*, occurs in Utah.

***Cylindropuntia acanthocarpa* var. *coloradoensis* (L. D. Benson) Pinkava, Colorado Desert cholla**



Description: Buckhorn cholla is a cylindric stemmed, freely branching, shrublike cactus that may grow up to 2 m tall. The stems branch widely from near ground level and have segments that are up to 30 or more cm long and up to 3 cm thick. The areoles are subcircular with up

to 30 spines. The flowers are yellow to reddish-orange and appear in March–early July. The anthers are yellow with red filaments. The fruits are dry at maturity, up to 4 cm long, tan or brown. The seeds are up to 5 mm long and tan or whitish.

Habitat and range: This species grows in Mojave Desert shrub and pinyon-juniper communities in Washington Co., at 760–1220 m, and in Arizona, California, Nevada, and Mexico.

Comments: Buckhorn cholla provides cover and nesting sites for cactus wrens, doves, thrashers, and packrats. *Cylindropuntia acanthocarpa* var. *coloradoensis* hybridizes with *C. echinocarpa* to form *C. xdeserta* (Griffiths) Pinkava, which has intermediate characters from its parents, with green to orange-yellow flowers that have yellow to red filaments. *Coloradoensis* refers to the lower Colorado River region, where this species is found.

Cylindropuntia echinocarpa (Engelm. & J. M. Bigelow) F. M. Knuth, Silver or golden cholla



Description: Silver cholla is a dense, freely branched, round stemmed, shrub-like species, with stems up to 1.5 m tall. Individual segments may be up to 12 cm long. The plants produce a distinct trunk-like stem that may account for half of the total height. The areoles are round, usually bearing up to 12 spines that are up to 3 cm long and silvery or yellow. The glochids are very small. The flowers are up to 2.3 cm long, with tepals that are greenish yellow or somewhat reddish and bloom in the spring. The fruits are dry and green, eventually becoming light brown.

Habitat and range: Silver cholla grows in Mojave Desert shrub communities in Washington and possibly Beaver Cos., at 760–1376 m, and in Arizona, California, Nevada, and Mexico.

Comments: *Cylindropuntia echinocarpa* has been shown to hybridize with *C. acanthocarpa* and *C. whipplei*. It provides important nesting sites for birds. *Echino* means “prickly” or “spiny” and *carpa* means “fruit.”

Cylindropuntia whipplei (Engelm. & J. M. Bigelow) F. M. Knuth, Whipple's cholla

Description: Whipple's cholla may be mat forming or erect and is up to 1.5 m tall. The stem segments are up to 15 cm long and 2.2 cm thick. The tubercles are prominent, up to 10 mm long and 5 mm wide. The areoles produce up to 10 spines in the axils. The spines are straight, up to 3 cm long, and awl shaped or flattened. The glochids are yellow, tan, or whitish. The flowers are up to 3 cm long, with greenish-yellow or yellow tepals, and appear in late spring–early summer. The fruits are fleshy at maturity, yellow, and up to 3 cm long. The seeds are tan and up to 3 mm long.

Habitat and range: Whipple's cholla grows in xeric sagebrush, Colorado Plateau shrub, sagebrush-grass, and pinyon-juniper communities in Beaver, Iron, Kane, Millard, San Juan, and Washington cos. at 1340–1895 m. It is also reported from Arizona, Colorado, Nevada, and New Mexico.

Comments: Whipple's cholla is the most cold-hardy of Utah's chollas. It is known to hybridize with *Cylindropuntia echinocarpa* and *C. acanthocarpa*. *Whipplei* honors Amiel Weeks Whipple, a 19th-century engineer and surveyor with the Mexican Boundary Survey.

***Echinocereus* Engelm.**

Echino means “spiny” and *cereus* means “waxy.”

***Echinocereus coccineus* Engelm., Scarlet hedgehog cactus**

Description: Claret cup is an erect cylindrical cactus, 0.5–4 dm tall, that grows in clumps. The stems generally have 6–14 ribs. The spines are 7–19, smooth, straight, and round in cross section. The flowers are unisexual, slightly constricted, usually scarlet, sometimes slightly red-violet or orange, up to 5 cm long, and bloom in late March–June. The fruits are 20–40 mm long.

Photo by Dordie Woodruff



Habitat and range: In Utah, scarlet hedgehog cactus is known only from eastern Washington Co. It is also found in Arizona, Colorado, New Mexico, Texas, and Mexico.

Comments: *Echinocereus coccineus* is pollinated primarily by hummingbirds but sometimes by bees. *Coccineus* means "scarlet."

***Echinocereus engelmannii* (Parry ex Engelm.) Lem., Pink-flowered hedgehog cactus**



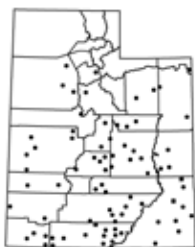
Description: Pink-flowered hedgehog cactus may be up to 7 dm tall, with cylindric stems up to 9 cm thick. The stems occur separately or, more often, 2 to several together, and have up to 13 ribs. The tubercles are indistinct. The areoles are subcircular and bear up to 9 central spines. The spines are stout, up to 7 cm long, and straight to curved or twisted. The radial spines are up to 14 in number and to 50 mm long. The flowers are

up to 9 cm long, pink to dark red-violet, and bloom March–April. The fruits are oblong or ovoid, green or reddish (nearly as red as strawberries in some) at maturity, and bear clusters of spines that often drop before the fruits are fully ripe. The seeds are black, pitted, and up to 1.5 mm long.

Habitat and range: Pink-flowered hedgehog cactus occurs in Mojave Desert shrub, salt desert shrub, Colorado Plateau shrub, mountainbrush, and pinyon-juniper communities in Beaver, Garfield, Juab, Kane, Millard, San Juan, Tooele, Washington, and Wayne cos., at 760–1895 m. It also is found in Arizona, California, and Nevada.

Comments: *Echinocereus engelmannii* shows much variation in its spine and flower characteristics. Since spines are often lacking on the fruits, they are favorite sweet treats for packrats, mice, and birds. *Engelmannii* is named after George Engelmann, a 19th-century German-born botanist who was influential in describing the flora of the American West.

Echinocereus mojavensis (Engelm. & J. M. Bigelow) Rumpler, Mojave hedgehog cactus



Description: Mojave hedgehog is an erect cylindrical cactus, 10–45 cm tall, occurring in clumps. The stems have 8–14 ribs. The spines are usually 5–11 per areole, straight or curved, round in cross section, and slightly rough under magnification. The flowers are perfect, 5–8.8 cm long, scarlet, and bloom April–June. The fruits are green or yellow-green to pink, usually 20–35 mm long.

Habitat and range: Mojave hedgehog occurs in all central and southern Utah counties, in Mojave Desert shrub to coniferous forest communities. It also is found in Arizona, California, Colorado, Nevada, and New Mexico.

Comments: *Echinocereus mojavensis* is primarily pollinated by hummingbirds. *Mojavensis* is named for the Mojave River, but the species is not restricted to that region.

Echinomastus Britton & Rose

Echino means “spiny” and *mastus* means “breast,” referring to the spiny tubercles.

Echinomastus johnsonii (Parry ex Engelm.) E. M. Baxter, Johnson's little barrel cactus

Description: Johnson's little barrel cactus has solitary or, rarely, branched stems up to 25 cm tall and 10 cm wide. The areoles are 21–26 mm apart along the ribs and have a woolly groove running from the areole to the axil. There are 13–24 spines per areole, pale yellow, pinkish, or brownish that nearly obscure the stem. The radial spines are up to 4 cm long. There are up to 9 central spines per areole. The flowers are up to 8.3 cm long, yellow, pink or red-violet, and appear in early March–May. The bases of the inner tepals bases are usually blotched with maroon spots. The fruits are almost spherical, up to 18 mm in diameter, and dehisce along a single longitudinal suture.

Habitat and range: Johnson's little barrel cactus occurs in Mojave Desert shrub communities in Washington Co., at 760–1250 m. It also is found in Arizona, California, and Nevada.

Comments: *Echinomastus johnsonii* is becoming rare in some areas, because of exploitation by commercial collectors. *Johnsonii* honors Joseph Ellis Johnson, an early Mormon settler and 19th-century horticulturist.

***Ferocactus* Britton & Rose**

Ferocactus is Latin for "fierce," referring to the heavy spines.

***Ferocactus cylindraceus* (Engelm.) Orcutt, Red barrel cactus**

Description: Red barrel cactus has solitary stems that may grow up to 15 dm tall and 5 dm in diameter. There are usually up to 32 ribs per stem. The areoles, produced along the rib crest, are up to 1.5 cm long and brown and woolly when young. There are up to 32 spines per areole, with principal spines that are whitish, yellow, pink, and dull red, or even brown. The strongest central spines may be curved, but rarely hooked. The spines bear annular colored bands and usually have flat surfaces. The flowers are up to 7 cm long, maroon outside and yellow internally, and flower in early

spring to early summer. The fruits are up to 6.6 cm long and 5 cm wide, bright yellow or, rarely, reddish, fleshy or leathery, and dehisce from a basal pore. The seeds are up to 3 mm long and pitted.



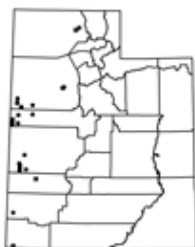
Habitat and range: Red barrel cactus usually grows on rocky slopes in Mojave Desert shrub communities in Washington Co., at 760–1375 m. It also occurs in Arizona, California, Nevada, and Mexico.

Comments: *Ferocactus cylindraceus* is the largest native Utah cactus. The plants are exploited through illegal collecting. A cactus measuring 1 m tall may be 40–50 years old. *Cylindraceus* means “cylindrical.”

***Grusonia* K. Schum.**

Grusonia is named for Hermann A. J. Gruson, a German plant collector, particularly of succulents.

***Grusonia pulchella* (Engelm.) H. Rob., Sand club-cholla**



Description: Sand club-cholla grows up to 2 dm tall, with stems that usually form clumps having tuber-like roots. The stems are up to 5 cm long and 1.5 cm thick, with segments that are clavate or cylindrical and green or blue green. The tubercles are up to 9 mm long and 5 mm wide. The distal areoles may have up to 15 straight or curved spines that are up to 6 cm long, divergent to deflexed, and distinctly flattened. Some areoles may be spineless. The outer tepals are green, with pinkish margins, and up to 4.5 cm long. The inner tepals are violet. The flowers appear in late spring. The fruits are red, up to 3 cm long, and fleshy at maturity. The whitish seeds are up to 4.5 mm long.

Habitat and range: Sand club-cholla grows in Mojave Desert shrub, salt desert shrub, and xeric sagebrush communities, often above playas in Beaver, Box Elder, Juab, Millard, Tooele and Washington cos. in western Utah, at 1430–1770 m. It is endemic to the Great Basin, and also known from California and Nevada.

Comments: *Grusonia pulchella* has large showy flowers that make it an attractive rock-garden landscape option, but it is not easy to cultivate. *Pulchella* means “pretty.”

Mammillaria Haw.

Mammillaria means “breast,” referring to the nipple-shaped tubercles of this genus.

***Mammillaria tetrancistra* Engelm., Little fishhook cactus**



Description: Little fishhook cactus has short subglobose to shortly cylindric stems that are usually solitary, or few arising from a single root. The stems may be up to 15 cm tall and 6 cm wide. The tubercles are up to 10 mm long and usually somewhat woolly in the axils. The principal central spines are 1–4 in number, up to 15 mm long and dark red violet, and 1 or more is hooked. There are up to 45 mostly white radial spines. The flowers are up to 30 mm long, with outer tepals that are green, with pink margins, and inner tepals that are rose to light red violet and bloom in April–July. The fruits are up to 20 mm long, maturing bright red.

Habitat and range: *Mammillaria tetrancistra* grows in Mojave Desert shrub communities in Washington Co., at 760–1300 m. It also occurs in Arizona, California, Nevada, and Mexico.

Comments: During drought, the plants retract into the soil, where they are less conspicuous. *Tetrancistra* refers to the 3–4 fishhooks of the central spines.

Opuntia* Mill.Opuntia* Greek for “spiny plant.”***Opuntia aurea* E. M. Baxter, Pipe Springs cactus**

Description: Pipe Springs cactus forms low-growing clumps up to 25 cm tall. The stems are elliptic to obovate and spineless unless introgressed or hybridized, then with 1 to few yellow to gray spines. The stem segments are up to 15 cm long and 12 cm wide and do not readily break off. The stems are green to blue green and have 7–11 areoles per diagonal row across the middle of the stem. The flowers are yellow, pink, or of intermediate hues, with white to yellow filaments, and bloom in late spring. The fruits are tan to gray, dry, and spineless. The seeds are up to 1 mm in diameter.

Habitat and range: Pipe Springs cactus occurs in pinyon-juniper woodlands and on red sands in Kane and Washington cos., at 1220–2075 m, and in adjacent Arizona.

Comments: *Opuntia aurea* is endemic to the Colorado Plateau. It reportedly forms hybrids with *Opuntia polyacantha* var. *erinacea*, *O. pinkavae*, and *O. phaeacantha*. *Aurea* means “golden.”

***Opuntia basilaris* Engelm. & J. M. Bigelow**

A distinguishing character of the species as a whole is the white stigma. According to *A Utah Flora* (Welsh et al. 2008), two varieties of this large complex occur in Utah.

Opuntia basilaris var. *basilaris*, Beavertail pricklypear



Description: Beavertail pricklypear is an erect spineless cactus with stem segments that are mostly obovate, blue green, suffused with violet or blue, and usually up to 22 cm long and 12 cm wide. The glochids are brown. The flowers include pink tepals, red filaments, and white stigmas, and bloom in February–June. The fruits are dry and spineless.

Habitat and range: This variety occurs in Mojave Desert shrub communities in Washington Co., at 760–1770 m, and in Arizona, California, and Nevada.

Comments: In some areas, beavertail pricklypear is somewhat threatened by development and recreational activities. *Basilaris* is Greek for “basal” or “stretching from the base.”

Opuntia basilaris var. *heilii* S. L. Welsh & Neese, Heil’s beavertail cactus

Description: Heil’s beavertail cactus is smaller and less cordate than var. *basilaris*. In var. *heilii*, the stem segments are usually spineless, obovate to spatulate, and typically not very glaucous. The glochids are tan to yellowish. The flowers are pink, the stigmas are white, and flowers in May–June. The fruits are spineless and dry. The seeds are pale tan.

Habitat and range: This variety is endemic to the Colorado Plateau in Emery, Garfield, San Juan, and Wayne cos. It occupies clay or sandy soils, sometimes in extreme barren shale environments, at 1460–1680 m.

Comments: *Heilii* is named for present-day New Mexico botanist and cactus specialist Kenneth D. Heil.

Opuntia chlorotica Engelm. & J. M. Bigelow, Silver dollar cactus

Description: Silver dollar cactus may grow to 1.5 m tall and be quite tree-like. This species forms a distinct trunk that may be up to 30 cm long. The mature stem segments are light blue-green, orbicular, may be up to 20 cm long and equally wide. The spines are yellowish, deflexed, straight or weakly curved, and up to 4 cm long. The glochids are yellow, numerous, and up to 14 mm long. The flowers are up to 30 mm long, and the tepals are yellow, with a reddish tint. Flowering occurs in spring–summer. The spineless ovoid fruits are red-violet, maturing fleshy but then sometimes drying. The seeds are tan and up to 3 mm long, with smooth coats.

Habitat and range: Silver dollar cactus grows in Mojave Desert shrub communities in Washington Co., at 700–1400 m. It also occurs in Arizona, California, Nevada, New Mexico, and Mexico.

Comments: In winter the stems of *Opuntia chlorotica* orient themselves to receive maximum light for photosynthesis. *Chlorotica* means “light green” or “pale green.”

Opuntia engelmannii Salm-Dyck ex Engelm., Engelmann’s pricklypear

Description: Engelmann’s pricklypear may grow to 3 m tall in the southern part of its range, and sometimes has a short trunk. The stem segments are circular to obovate or rhombic and up to 40 cm long and wide with 1–5+ spines per areole, light colored with dark bases, spreading to deflexed. The flowers are yellow (unless hybridized) and bloom in spring. The fruits are up to 9 cm long, spineless, fleshy, dark red, and very juicy, with a small seed cavity.

Habitat and range: Engelmann’s pricklypear may occur only in hybrid swarms in Washington Co., at 905–1960 m. It is found in Arizona, California, Nevada, New Mexico, Texas, and Mexico.



Photo by Dorde Woodruff

Comments: *Opuntia engelmannii* var. *engelmannii* is the representative variety of this species in Utah, though other varieties occur in much of the southwestern United States. Engelmann's pricklypear often forms hybrids with *Opuntia phaeacantha*. Hybrid swarms are found in Zion National Park, Utah, and Grand Canyon National Park, Arizona. Known as a cactus pear, the fruit is attractive, edible, and the most desirable cactus fruit in the state. However, this taxon has a very limited distribution in Utah, and most plants occur in Zion National Park or on private land. *Engelmannii* is named after George Engelmann, a 19th-century German-born botanist who was influential in describing the flora of the American West.

***Opuntia fragilis* (Nutt.) Haw., Brittle pricklypear**



Description: Brittle pricklypear is a mat-forming cactus that grows up to 10 cm tall. The stem segments are subspheric to subcylindric or flattened,

up to 6 cm long and 3 cm wide, and may readily disarticulate. The spines are 3–8 per areole and up to 24 mm long, or sometimes absent. The flowers appear in late spring or early summer and are yellow or rarely pink. The fruit is dry and sometimes bears spines.

Habitat and range: Brittle pricklypear is widespread in pinyon-juniper, ponderosa pine, xeric sagebrush, mountainbrush, and aspen-mixed conifer communities in Box Elder, Cache, Carbon, Duchesne, Emery, Garfield, Kane, Piute, Rich, Salt Lake, Sanpete, San Juan, Sevier, Uintah, Utah, Wayne, and Weber cos., at 1370–2565 m. It also occurs in many other U.S. states and in Canada.

Comments: *Opuntia fragilis*, like many *Opuntia* species, increases with overgrazing. In Utah, it commonly hybridizes with *O. polyacantha* or *O. aurea*, and swarms may contain quite different-looking individuals. It often forms large spreading plants with many pads. The stem segments of unhybridized plants are easily detached and are dispersed primarily by animals. *Fragilis* means “fragile” or “brittle” Referring to the easy detachment of pads.

***Opuntia macrorhiza* Engelm., Plains pricklypear**



Description: Plains pricklypear is up to 3.5 dm tall, with branches that may be sprawling or erect. The stems are dull green to somewhat glaucous, usually obovate, appear cross-wrinkled when dehydrated, are turgid in the growing season, and become flabby and lay down in winter. The stem segments are up to 20 cm long and 11 cm wide. The areoles are usually 5–8 per diagonal row. The spines usually occur on the distal areoles and are 1–4 per areole, up to 6 cm long, and white to red brown. The outer tepals are greenish, and the inner tepals are yellow, with a reddish base, blooming in late spring or early summer. The fruit is spineless, fleshy, slender, and dull red when mature.

Habitat and range: Disjunct populations of Plains pricklypear are known from Davis and Salt Lake cos; the plants are larger than usual for

the species. It has been reported from Washington and recently Kane Cos. but has not been relocated. It is most common in the plains of Arizona, Arkansas, Colorado, Kansas, Missouri, New Mexico, Oklahoma, Texas, and Mexico.

Comments: *Opuntia macrorhiza* may form hybrids with other fleshy-fruited species. Spineless or few-spined specimens of *O. aurea* or *O. polyacantha* with widely-spaced areoles are often mistaken as this species. Though the fruits are edible and tasty, they are small compared with those of *Opuntia phaeacantha*, *O. engelmannii*, and, especially, those sold in Latino markets (*O. ficus-indica* and *O. joconostle*). *Macro* means “large” or “big” and *rhiza* means “root.” Our plants often lack the tuberous root.

***Opuntia phaeacantha* Engelm., Brown-spined pricklypear**



Description: Brown-spined pricklypear occurs as a decumbent or upright cactus, up to 1 m tall. The stem segments are obovate to circular, green to dark green, and reddish when stressed. The areoles are 5–7 per diagonal row, with 2–8 spines per areole on the distal 1/3 of the areoles, or the spines sometimes absent. When present, the spines are brown to white. The abaxial spines are usually deflexed, white, and much shorter than the central spine. The outer tepals are greenish, with yellow or red edges, and the inner tepals are yellow, or suffused with red or pink, and sometimes intermediate in color. Flowering occurs in late spring or early summer. The spineless fruit is fleshy, wine red to orangish, and up to 5 cm long.

Habitat and range: Brown-spined pricklypear occurs in Mojave Desert shrub, xeric sagebrush, Colorado Plateau shrub, pinyon-juniper, and mountainbrush communities in Garfield, Kane, San Juan, and Washington cos. It also is found in Arizona, California, Colorado, Kansas, Nevada, New Mexico, Oklahoma, Texas, and Mexico.

Comments: *Opuntia phaeacantha* forms hybrid swarms with *O. engelmannii* var. *engelmannii* in Zion National Park, Utah, and with other *Opuntia* species elsewhere. Hybrids may have flowers in colors other than

the typical yellow or yellow with red. The fruits are edible. *Phae* means “dark” or “dusky” and *acantha* means “spine.”

***Opuntia pinkavae* B. D. Parfitt, Pinkava’s pricklypear**



Photo by Albert Dean Stock

Description: Pinkava’s pricklypear grows up to 25 cm tall, with green segments that are narrow to broadly obovate. The stem segments are up to 15 cm long and 11 cm wide, with 4–8 areoles per diagonal row across the midstem. The areoles usually bear 1–3 slender, white to yellowish gray spines that may be up to 7 cm long and are sometimes absent on the lower 1/2 of the stem. The glochids are reddish brown and conspicuous. The flowers are pink and appear in May–June. The fruits are dry when mature.

Habitat and range: Pinkava’s pricklypear occurs in the grassland margins of pinyon-juniper woodlands in Washington and Kane cos., and in adjacent Arizona, at 1400–1600 m.

Comments: *Opuntia pinkavae* hybridizes with *O. aurea*. *Pinkavae* is named after present-day Arizona botanist and cactus specialist Donald Pinkava.

***Opuntia polyacantha* Haw., Pricklypear**



Opuntia polyacantha is a complex group of cacti that shows great variation and diversity, and thus has led to multiple taxonomic treatments. We follow the treatment in the *Flora of North America*, vol. 4, for this assemblage of cacti and include four varieties of *O. polyacantha* that occur in Utah. Further work is needed in Utah for this species’ bewildering variety of forms. The fruits are dry.

***Opuntia polyacantha* var. *erinacea* (Engelm. & J. M. Bigelow) B. D. Parfitt, Mojave pricklypear**

Description: Mojave pricklypear grows up to 25 cm tall, with spiny stem segments that are elliptic to obovate, up to 20 cm long and 10 cm wide. There are 8–14 areoles per diagonal row across the midstem. The areoles have 1–18 yellow to dark brown spines, up to 9 cm long, that turn gray with age. The older segments have spines that are reflexed, more numerous, and less straight than younger stems. The flowers are dark pink and appear in late spring. The fruit is very spiny, stout, and up to 2 cm long.



Habitat and range: This variety occurs in Mojave Desert shrub and pinyon-juniper communities, in alluvial soils in Garfield, Iron, Kane and Washington cos., at 1000–1400 m. It also is found in Arizona, California, and Nevada.

Comments: *Erinacea* refers to resemblance of Mojave pricklypear to a hedgehog.

***Opuntia polyacantha* var. *hystricina* (Engelm. & J. M. Bigelow) B. D. Parfitt, Porcupine pricklypear**

Description: Porcupine pricklypear has obovate stem segments that are up to 10 cm long and 8 cm wide, and have 8–10 areoles per diagonal row at the midsection. The areoles have 2–6 longer spines that are yellow gray to brown to black, and 4–6 shorter spines that are gray white and reflexed. The flowers are yellow to pink, or intermediate hues, and appear in late spring. The fruits bear spines up to 18 mm long.

Habitat and range: This variety occurs on grasslands and in pinyon-juniper woodlands throughout the lower 2/3 of Utah. It also is found in Arizona, California, Colorado, Nevada, and New Mexico.

Comments: *Hystricina* means “like a porcupine.”

***Opuntia polyacantha* var. *nicholii* (L. D. Benson) B. D. Parfitt, Navajo Bridge pricklypear**

Description: Navajo Bridge pricklypear grows up to 25 cm tall, with stem segments that are narrowly to broadly obovate, up to 25 cm long and

18 cm wide. The spines are usually of two kinds, present in all the areoles. The major spines are pink gray, 1–5 per areole, and up to 15 cm long. Minor spines are white to gray, deflexed, and up to 20 cm long. The areoles are 8–11 per diagonal row. The flowers are yellow to pink and bloom in spring. The fruits are dry and more or less spiny.

Habitat and range: This variety is endemic to the Colorado Plateau. It occurs especially along the Colorado River, and in salt desert shrub and Colorado Plateau shrub communities in Garfield, Kane, and San Juan cos., at 1200–1300 m. It also is found in adjacent Arizona.

Comments: *Nicholii* is named after A. A. Nichol, a 20th-century naturalist and collector who studied the Arizona flora.

***Opuntia polyacantha* var. *polyacantha*, Central pricklypear**



Description: Central pricklypear has broadly obovate to circular segments, up to 15 cm long and equally wide. The areoles are 6–11 per diagonal row and usually bear two types of spines. The major spines are 1–3 per areole, yellow brown to gray, and may be up to 35 mm long. Minor spines are usually deflexed, white, and up to 10 mm long. The flowers are up to 8 cm long, with green sepaloids that have yellow or red margins, and the petaloids are yellow to pink, blooming in late summer. The fruits are dry and spiny and may be up to 4 cm long.

Habitat and range: This variety grows in salt desert shrub, Colorado Plateau shrub, xeric sagebrush, pinyon-juniper, sagebrush-grass, mountainbrush, and aspen-mixed conifer communities throughout the state. It occurs as high as 2900 m in dry areas on desert peaks. It is also found in Arizona, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North and South Dakota, Oklahoma, Texas, Wyoming, and Canada.

Comments: *Poly* means “many” and *acantha* refers to spines.

***Pediocactus* Britton & Rose**

Pedio refers to “a plain” or “level country” and *cactus* means “spiny plant.”

The flowers of this genus are usually borne near the apex of the plant. The fruits are dry and dehisce along 1 vertical suture.

***Pediocactus despainii* S. L. Welsh & Goodrich, Despain's cactus**

Photo by Jim Harris

**Description:**

Despain's cactus is subglobose to obovoid, up to 6 cm tall and 9.5 cm wide, and usually unbranched. The areoles are villous to glabrate and lack central spines.

The radial spines are 9–15 per areole, smooth, relatively hard, and up to 6 mm long. The flowers are yellow bronze to peach bronze or pink and bloom in late April–early May. The fruits are obovoid, up to 11 mm long and 12 mm wide.

Habitat and range: Despain's cactus is endemic to Emery and Wayne cos., at about 1830 m, in open pinyon-juniper communities on cobble or pebble soils.

Comments: *Pediocactus despainii* is closely allied with *P. winkleri*. *Despainii* honors present-day American cactus expert Kim Despain. Despain's cactus is of conservation concern.

Pediocactus sileri (Engelm. ex J. M. Coult.) L. D. Benson, Siler's cactus**Description:**

Siler's cactus is a solitary or few-branched cactus that grows to 25 cm tall and 12 cm wide. It is depressed-hemispheric to cylindric and has areoles that are villous to lanate. The central

spines, up to 7 per areole, are brownish black, aging to pale gray or white, and straight or slightly curved. The radial spines are up to 16 per areole and white. The sepals are brown, with white margins, and conspicuously fringed (a diagnostic character). The petals are yellow or yellowish, with purple veins, and bloom in the spring. The dry fruit is greenish yellow, cylindrical, and up to 15 mm long.

Habitat and range: Siler's cactus grows on gypsum clay and sandy soils of the Moenkopi Formation. It is considered a narrow endemic that occurs in Kane and Washington cos., at 900–1600 m, and in Arizona.

Comments: *Sileri* is named for Andrew Lafayette Siler, a 19th-century rancher and plant collector. *Pediocactus sileri* is of conservation concern.

Pediocactus simpsonii (Engelm.) Britton & Rose, Simpson's cactus

Description: Simpson's cactus may be solitary or somewhat colonial, and is ovoid to globose. The stems are usually up to 25 cm long and 15 cm wide. The spines are smooth, hard, rigid, and of two types. The central

spines are 6–12 per areole, spreading to erect, reddish brown to black, and up to 1 mm wide at the base. The radial spines are 10–30 per areole, nearly straight, white to reddish brown, and up to 20 mm long. The tepals may be toothed, irregularly lobed, or entire, and are often undulate. The flowers bloom in spring–early summer. The outer tepals have greenish-brown mid-stripes, while the inner tepals are white, pink, magenta, yellow, or yellow green. The fruits are reddish brown when mature.

Habitat and range: In Utah, Simpson's cactus grows in all counties except Cache, Davis, Grand, Kane, Morgan, Rich, Salt Lake, Summit, Wasatch, and Weber cos., at 1460–2830 m. It is widespread in the western United States, where it occurs in Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, South Dakota, and Wyoming.

Comments: *Pediocactus simpsonii* is the most widespread *Pediocactus* species and grows at higher elevations than other cacti in the genus. It exhibits great diversity in its forms, growing on the Colorado Plateau, in the West Desert, and in the Uinta Basin (where plants may be up to 45 cm long and 20 cm wide). *Simpsonii* is named after Captain James H. Simpson, who headed the 19th-century Utah Expedition survey.

***Pediocactus winkleri* K. D. Heil, Winkler's cactus**



Photo by NPS

Description: Winkler's cactus has solitary or clumped stems, up to 7 cm tall and 5 cm wide and subglobose to obovoid. The areoles are woolly and bear only radial spines up to 4 mm long and spread downward. The flowers are up to 2.5 cm long. The tepals are peach pink, oblanceolate, and open in early spring. The mature fruits are reddish brown, up to 10 mm long and 11 mm wide.

Habitat and range: Winkler's cactus occupies fine-textured saline substrates in salt desert shrub communities in Emery and Wayne cos., at 1460–1590 m.

Comments: *Pediocactus winkleri* is an endemic species. Recent studies indicate a close relationship with *P. despainii*. *Winkleri* refers to Mrs.

Agnes Winkler and her son Jim, who discovered this species. Winkler's cactus is of conservation concern.

***Sclerocactus* Britton & Rose**

Sclero means "hard" and *cactus* means "spiny plant."

The flowers are usually borne near the stem apex. The fruits are dry at maturity and dehisce by various means.

***Sclerocactus blainei* S. L. Welsh & K. H. Thorne, Blaine's little barrel cactus**

Description: Blaine's little barrel cactus has solitary stems that are unbranched or with a few ovoid to cylindric branches that are up to 20 cm long and 17 cm wide. The stems have prominent tubercles, with dense radial and central spines that somewhat obscure the stems in mature plants. Some spines are hooked and some flat or even ribbon-like. The outer tepals have reddish-brown midstripes and pink violet or red violet margins. The inner tepals are pink to red-violet. Flowering occurs in late April–May.

Habitat and range: Blaine's little barrel cactus grows on igneous, calcareous or sandy soils in grasslands, salt desert shrub, and xeric sagebrush communities. It is an obscure taxon that occurs in Iron Co., at 1420–1845 m, and in Nevada.

Comments: *Sclerocactus blainei* is similar to *S. spinosior*, but it has larger flowers, longer adaxial central spines, and, on average, a larger and spinier plant body. Blaine's little barrel cactus is a rare cactus that is not well documented in the state. *Blainei* is named for Blaine Tree Welsh, a member of the crew who collected this species. Blaine's little barrel cactus is of conservation concern.

***Sclerocactus brevispinus* K. D. Heil & J. M. Porter, Pariette cactus**



Photo by Dorde Woodruff



Description: Pariette cactus is a small, more or less spherical cactus, no larger than 9 cm long and 8 cm wide. It may be solitary, or form a clump with age. The stems are usually green, but may be somewhat glaucous. It typically has 13 ribs, with tubercles bearing short spines that do not obscure the stem. There are 6–9 radial spines, usually with 1 very short

(about 1 mm long) straight central spine per areole. The small, pale pink flowers bloom in late April–May. The dry fruit is tan and up to 15 mm long and 12 mm wide.

Habitat and range: Pariette cactus grows only in saltbush flats in Duchesne and Uintah cos., at 1400–1600 m.

Comments: The diagnostic characters for *Sclerocactus brevispinus* include spherical stems, short spines, and small pink flowers. Variations may occur, due to hybridization with the neighboring *S. wetlandicus*. *Brevispinus* refers to the short spines. Pariette cactus is of conservation concern.

***Sclerocactus parviflorus* Clover & Jotter, Common little barrel cactus**



Photo by Jim Harris

Description: Common little barrel cactus is cylindric as an adult and often solitary, but it can form clumps, especially in favorable environments. It is quite variable throughout its range and, on average, becomes smaller and less spiny toward the north. There are usually 13 ribs, and the spines often obscure the stem. The areoles have 8–17 radial spines and 5–8 central spines, with usually 1–3 being hooked. The outer tepals are greenish or greenish brown, with reddish or paler edges. The inner tepals most often are pink, sometimes yellow, and rarely white, with entire to fringed margins. The flowers appear in April–May. The fruits are pale red, tan, or gray when dry, up to 30 mm long and half as wide.

Habitat and range: *Sclerocactus parviflorus* grows on sandy, gravelly, or clay hills and flats in Colorado Plateau shrub, xeric sagebrush, salt desert shrub, and pinyon-juniper communities. It occurs widely in the Colorado

and Green River drainages in Carbon, Duchesne, Emery, Garfield, Grand, Kane, San Juan, Sevier, Uintah, and Wayne cos., at 1100–2103 m. It also is found in Arizona, Colorado, and New Mexico.

Comments: *Parviflorus* means “small flowered,” which is a misnomer, since the flowers are larger than those of most species in the genus.

Sclerocactus pubispinus (Engelm.) L. D. Benson, Great Basin little barrel cactus

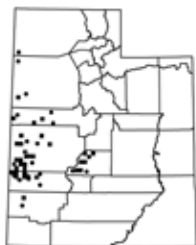


Photo by Jim Harris



Description: Great Basin little barrel cactus is a short, depressed hemispheric to cylindric, usually unbranched cactus, with 11–14 ribs and prominent tubercles. Each areole has 6–11 radial spines and central spines are usually hooked and do not obscure the stems. The flowers are typically yellow or bronze and bloom in April–May. The fruits are up to 12 mm long, 10 mm wide, and barrel shaped.

Habitat and range: Great Basin little barrel cactus grows on light-colored soils of limestone or dolomite, on foothills or valley slopes in xeric sagebrush, salt desert shrub, and pinyon-juniper communities in western Utah and Nevada, at 1350–2134 m.

Comments: *Sclerocactus pubispinus* is endemic to the Great Basin. Its less spiny appearance, different flower color, average higher elevation and latitudinal range, and a different soil preference help to distinguish this cactus from the related *S. spinosior*. Hybridization occurs between these two taxa. *Pubispinus* refers to downy or hairy spines.

Sclerocactus spinosior (Engelm.) D. Woodruff & L. D. Benson, Spiny little barrel cactus

Photo by Dordre Woodruff

Description: Spiny little barrel cactus is usually solitary and grows no more than 20 cm tall. The dark green stems are often glaucous and usually bear 11–14 prominent ribs. The stems are often obscured by the spines. Each areole has up to 20 spines. The central spines are stout, and may be hooked or straight, with one adaxial spine that is white and flattened. The flowers are dark pink and bloom in late April–May. The dry, barrel-shaped fruits are up to 13 mm long and 12 mm wide.

Habitat and range: *Sclerocactus spinosior* occurs on igneous or, less often, calcareous gravelly soils in xeric sagebrush, salt desert shrub, and pinyon-juniper communities in Beaver, Iron, Juab, Millard, Sevier and Tooele cos., at 1355–1951 m.

Comments: Spiny little barrel cactus is partially sympatric and related to *S. pubispinus*. *Spinosior* means “spiny.”

Sclerocactus wetlandicus Hochstätter, Uinta Basin hookless cactus

Photo by Dordre Woodruff

Description: Uinta Basin hookless cactus is usually unbranched, occasionally branched, spherical to cylindrical, and grows to about 13 cm tall (a few exceptionally large plants are 19 cm tall). The stem is green to bluish green and glaucous, usually having 12–14 ribs, with conspicuous tubercles. There are 6–10 white radial spines and 4–6 similar, but usually darker-tipped, central spines at each areole that usually do not obscure the stem. The central spines may be curved, but are usually not hooked. The flowers are fragrant, pale to dark pink, funnellform to campanulate, and bloom in late April–May. The ovoid fruits are up to 25 mm long and 12 mm wide.

Habitat and range: Uinta Basin hookless cactus grows on gravelly or rocky hills or mesa tops in salt desert shrub, sagebrush-grass, and pinyon-juniper communities, at 1300–1500 m, in Carbon, Duchesne, and Uintah cos.

Comments: *Sclerocactus wetlandicus* is endemic to the Colorado Plateau. *Wetlandicus* means “of the wetlands” (which is a misnomer, since it occupies dry sites, but it was named for the Pariette Wetlands preserve). Uinta Basin hookless cactus is of conservation concern.

Sclerocactus whipplei (Engelm. & J. M. Bigelow) Britton & Rose, Whipple’s little barrel cactus



Description: Whipple’s little barrel cactus is small, ovoid to cylindric, and may be solitary or in small clusters. It may grow up to 14 cm tall and 15 cm wide, with 13–15 tuberculate ribs. Each areole bears 7–12 radial spines, and 6 central spines that include a characteristic sword-like, flattened, adaxial spine directed toward the stem apex. The spines may somewhat obscure the stem. The flowers are mostly yellow and bloom in April. The dry fruits are often reddish at maturity and up to 25 mm long and 15 mm wide.

Habitat and range: Whipple’s little barrel cactus grows in extreme southeastern Utah, but it is found mostly in adjacent northeastern Arizona. It occurs on gravelly or sandy hills, canyon rims, and mesas in desert grassland, xeric sagebrush, salt desert shrub, and pinyon-juniper communities, at 1385–1900 m.

Comments: The flattened sword-like spine and yellow flowers are diagnostic for *Sclerocactus whipplei*. *Whipplei* is named after Amiel Weeks Whipple, a 19th-century engineer and surveyor with the Mexican Boundary Survey.

Sclerocactus wrightiae L. D. Benson, Wright's little barrel cactus

Photo by Dorde Woodruff

Description: Wright's little barrel cactus is pale green, depressed-spherical to short-cylindric, and grows up to 12 cm long and 8 cm wide. It usually has 13–16 ribs, with somewhat developed tubercles. The areoles bear 5–10 radial spines and 3–4 central spines that only slightly obscure the stem. The abaxial central spine is hooked and white to tan, with a black tip. The most distinguishing characteristic is its small, fragrant, narrowly campanulate, pink to pale pink, pale yellow, or white flowers with red filaments that bloom in late April–May.

Habitat and range: Wright's little barrel cactus is an endemic, occupying open bare clay hills and mesa tops in xeric sagebrush and salt desert shrub communities in Emery and Wayne cos., near the Fremont River, at 1300–2050 m.

Comments: *Wrightiae* honors present-day American cactus expert Dorde Wright Woodruff. *Sclerocactus wrightiae* is of conservation concern.



CANNABACEAE—Hemp family

Members of the hemp family are indigenous to temperate regions in the Northern Hemisphere. Many species are dioecious. The flowers are small and inconspicuous, pollinated by the wind. Members of this family have a long history with humans, resulting in many cultivars, some of which have significant economic value. Hop (*Humulus lupulus*) fruits contain substances used for flavoring beer. Some varieties of hemp (*Cannabis sativa*) are used for fiber in clothing, and others have medicinal value. In Utah, two woody species are native, *Celtis reticulata* (traditionally included in the family Ulmaceae) and *Humulus lupulus*.

Celtis L.

Celtis is Greek for “lotus.”

Celtis reticulata Torr., Netleaf hackberry



Description: Netleaf hackberry occurs as a small tree or large shrub, up to 5 m tall. Individual plants are widely spreading and almost as broad as tall. The species develops a strongly reticulated bark, with distinctive corky ridges. The leaves are alternate and simple, up to 8 cm long and 4 cm wide, with entire to sparsely serrate margins and rough scabrous surfaces that are strongly reticulate veined. The leaf blades are ovate to lanceolate, with oblique, round, or cordate bases. Flowering occurs in March–June. The fruits are thinly fleshed drupes, orange to deep red at maturity.

Habitat and range: Netleaf hackberry is common throughout Utah and grows in xeric sagebrush, sagebrush-grass, and mountainbrush communities, at 880–1800 m. It also occurs in California, Idaho, Texas, Washington, and Mexico.

Comments: *Celtis reticulata* often has large insect galls that persist on the leaves throughout the season. The fruits are sweet and eaten by both birds and wild canine species, aiding seed dispersal. The plants provide

food and cover for wildlife, especially winter food for birds. Rubbing the leaf from tip to base feels like the surface of a cat's tongue. *Reticulata* refers to the netted or reticulate leaves.

***Humulus* L.**

Humulus possibly refers to hops.

***Humulus lupulus* L., American hop**



Description: American hop grows as a vine, with angular, rough, scabrous stems up to 2 m long. The plants are dioecious. The leaves are opposite, 3–5 lobed, broadly ovate, deeply cordate basally, serrate or doubly serrate, up to 3.5 cm long at maturity, rough-hairy above, and glandular spotted below. The fruiting spikes are up to 4 cm long at maturity. The flowers bloom in July–August. The fruits are achenes, enclosed by a persistent calyx and acrescent bracts.

Habitat and range: American hop grows in riparian and moist forests throughout the state, at middle and lower elevations. It is found throughout most of North America.

Comments: In Utah, *H. lupulus* var. *neomexicanus* A. Nelson & Cockrell is our indigenous variety. *Lupulus* means “hops” or “hop-like.”



CAPRIFOLIACEAE—Honeysuckle family

The honeysuckle family is composed primarily of woody plants that include shrubs, vines, and subshrubs. Members of the family occupy temperate regions of the Northern Hemisphere or mountains in the tropics. The species have opposite branching. The flowers are large and zygomorphic, with inferior ovaries. The fruits include berries, capsules, and dry drupes. The flowers are pollinated mainly by insects and hummingbirds. Many species of the family have been cultivated and are desirable ornamentals: honeysuckle, snowberry, coralberry, and weigela. Others are invasive, such as Japanese honeysuckle (*Lonicera japonica*), and have become serious threats to native flora in the eastern United States. In Utah, there are three native woody genera and six taxa.

Linnaea L.

Linnaea is named after Carl Linnaeus, the father of modern taxonomy.

Linnaea borealis L., Twinflower



Photo by Sherel Goodrich



Description: Twinflower is a low-growing subshrub, with opposite branching and trailing stems. The leaves are up to 2 cm long and 1.5 cm wide, elliptical to ovate or orbicular, with rounded

to obtuse tips and entire to few-toothed margins. The flowers are borne in pairs, at the end of stipitate glandular peduncles. They are pink and hairy within and bloom in June–September. The fruit is dry, up to 3 mm long, and hairy.

Habitat and range: Twinflower is common in northern Utah, at 1830–2930 m. It occupies Douglas fir, aspen-mixed conifer, and spruce-fir communities. It is circumpolar.

Comments: *Linnaea borealis* has fragrant, conspicuous flowers and could be used as a ground cover in gardens. *Borealis* means “northern.”

Lonicera L.

Lonicera is named after Adam Lonitzer, a German naturalist and herbalist.

Lonicera involucrata (Richardson) Banks ex Spreng., Black twinberry



Description: Black twinberry is an open shrub, with spreading and arching branches, usually up to 2 m tall. The stems are quadrangular and glabrous. The leaves are opposite, with short petioles, up to 16 cm long and 7.5 cm wide, elliptic to oblanceolate, with entire margins and acute or rounded bases, green and glabrous above (sometimes hairy along the midvein), and pale and somewhat hairy below. The flower peduncles are up to 4 cm long. The flowers are borne in pairs in the leaf axils and bloom in May–July. The flowers are subtended by greenish, purplish, or somewhat blackish bracts up to 1 cm long. These bracts enlarge and become black and fleshy as the fruit matures. The calyx is about 1 mm long, and the corolla is sympetalous, up to 18 mm long, yellowish, and sometimes tinged with purple. The berries are pubescent, black, and up to 12 mm long.

Habitat and range: Black twinberry grows along waterways and at slope bases where soil moisture is abundant, in riparian, aspen-mixed conifer, Douglas fir, and spruce-fir communities in most Utah counties, at 1370–3235 m. It is also known from Alaska and Quebec and southward to New Mexico and California.

Comments: *Lonicera involucrata* is a good hummingbird plant. *Involucrata* means “with an involucre.”

Lonicera utahensis S. Watson, Utah honeysuckle

Description: Utah honeysuckle grows up to 2 m tall on favorable sites. The stems have a large solid white pith and the leaves are opposite, short petioled, and up to 8 cm long and 4 cm wide, ovate or oblong elliptic, and rounded or subcordate basally. The flowers appear in pairs in the upper leaf axils and are subtended by a pair of bracts. The peduncles are up to 3.5 cm long. The sympetalous corollas are ochroleucous or pale yellow, up to 2 cm long, and bloom in June–July. The flowers are slightly two lipped, with lobes that are shorter than the tube and spurred at the base. The fruit is a berry, up to 10 mm long, and red at maturity.



Habitat and range: Utah honeysuckle grows in mountainbrush, ponderosa pine, aspen-mixed conifer, and spruce-fir communities. It is found throughout Utah, at 1500–3145 m. It also occurs in British Columbia and Alberta and southward to Wyoming and California.

Comments: *Lonicera utahensis* is used for revegetation and landscaping. Grouse and bear eat the berries. *Utahensis* means “of Utah.”

***Symphoricarpos* DuRoi**

Symphora is Greek for “gathering” or “collecting” and *karpos* means “fruit,” referring to the clustering of the fruits.

***Symphoricarpos longiflorus* A. Gray, Long-flowered snowberry**



Description: Long-flowered snowberry is a handsome shrub, growing up to 1 m tall. The branches arch around the perimeter of the shrub. The young twigs may be glabrous or pubescent. The bark of older stems

detaches to form long persistent shreds. The leaves are opposite and oval to oblanceolate, up to 15 mm long and 7 mm wide. The fragrant flowers are glabrous, pink, with a slightly flaring tube up to 18 mm long with 5 short, spreading lobes. They are borne singly or in pairs in the leaf axils or on small terminal racemes, and bloom in May–July. The mature fruit is a white berry.

Habitat and range: *Symphoricarpos longiflorus* grows in xeric sagebrush, pinyon-juniper, sagebrush-grass, mountainbrush, and hanging garden communities throughout Utah, at 915–2900 m. It also occurs in Arizona, California, Colorado, Idaho, Nevada, New Mexico, Oregon, Texas, and Mexico.

Comments: *Longiflorus* means “long flowered.”

Symphoricarpos occidentalis Hook., Western snowberry



Photo by Sherel Goodrich

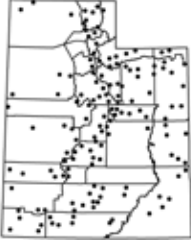


Description: Western snowberry grows up to 1 m tall. It sometimes spreads laterally by rhizomes to form small colonies. The young stems may be glabrous or puberulent. The leaves are opposite, simple, up to 8 cm long and 5 cm wide, ovate to elliptic, with margins that are entire, coarsely toothed, or lobed, glabrous above, and puberulent below, at least on the main veins. The flowers are borne in the leaf axils or in terminal, short, spike-like inflorescences. The corollas are pink to white, up to 8 mm long, hairy within, and bloom in June–August. The flower lobes are about equal in length to the corolla tube. The berries are white at maturity.

Habitat and range: *Symphoricarpos occidentalis* occurs under cottonwoods and willows in riparian communities. It is known from Daggett, Duchesne, and Uintah cos., at 1525–1895 m. It also grows in British Columbia and Manitoba and southward to Washington, Idaho, and Colorado.

Comments: *Occidentalis* refers to the west.

Symphoricarpos oreophilus A. Gray, Mountain snowberry



Description: Mountain snowberry grows up to 1.5 m on favorable sites. The young stems are puberulent or glabrous. The leaves are opposite, simple, ovate or elliptic, and up to 5 cm long and 2.5 cm wide. The leaf margins are entire or few toothed. The flowers are borne singly or in pairs in the leaf axils or, less frequently, in few-flowered terminal racemes, are tubular or campanulate, up to 13 mm long, and bloom in June–August. The corolla lobes are white to pink and much shorter than the tubes. The tubes may be glabrous or hairy. The fruit is a white berry, up to 12 mm in diameter.

Habitat and range: Mountain snowberry is one of the most common plants in our foothills and mountains. It is known from sagebrush-grass, mountainbrush, ponderosa pine, Douglas fir, aspen-mixed conifer, and spruce-fir communities throughout Utah, at 1370–3295 m. It is also known from Arizona, California, Nevada, New Mexico, Wyoming, and British Columbia.

Comments: *Symphoricarpos oreophilus* is resistant to fire and browsing. It improves soil stability and is used for revegetation. Its shredding bark has been used for string. The plant contains alkaloids (chelidonine) that may be poisonous to humans. *Oreo* means “mountain” and *philus* means “to love” or “loving.”



CARYOPHYLLACEAE—Pink family

The pink family is global in distribution but is most common in temperate climates or on tropical mountains. Most species are herbaceous, with few woody plants. Common characteristics include swollen nodes on the stem, usually opposite and simple leaves, regular flowers with superior ovaries, and fruits that are usually nonfleshy capsules. Many species are used as ornamentals (carnations, dianthus, baby's breath). Utah has only one native woody species, *Eremogone macradenia*.

Eremogone Fenzl

Eremo means “lonely, solitary, or desolate” and *gone* means “seed.”

Eremogone macradenia Ikonnikov, Shrubby sandwort



Description: Shrubby sandwort is a small shrub, up to 4 dm tall. The stems are glabrous to stipitate glandular. The deciduous leaves are opposite and needle-like or narrowly linear, up to 6 cm long and 2 mm wide. The flowers are white, up to 9 mm long, and appear in June–July. The fruit is a capsule.

Habitat and range: *Eremogone macradenia* is widespread in western and central Utah, where it occurs in Mojave Desert shrub, mountainbrush, pinyon-juniper, and spruce-fir communities, at 915–2990 m.

Comments: *Macrodenia* means “large glands.”



CELASTRACEAE—Staff-tree family

Members of the staff-tree family are mostly small trees, shrubs, and vines in tropical regions. The flowers of most of the species are perfect, regular, and usually small and inconspicuous. The ovary is superior, and the fruits are usually capsules. Many of its members are ornamentals, such as *Euonymus* and *Celastrus*. Utah woody natives include *Mortonia scabrella*, limited to the very southwestern corner of the state, and *Paxistima myrsinites*, which can be found in every county.

***Mortonia* A. Gray**

Mortonia named after Samuel George Morton, a 19th-century American naturalist.

Mortonia scabrella* A. Gray, *Mortonia

Description: *Mortonia* is an evergreen shrub, growing up to 1.2 m tall. The leaves are alternate ovate to obovate, up to 15 mm long, leathery, hispidulous, and borne on very short petioles. The flowers occur in a cymose inflorescence, blooming in April–May. The calyx is campanulate, 5 lobed, 10 ribbed, and up to 5 mm long. The 5 petals are white and about as long as the sepal lobes. The fruit is a capsule.

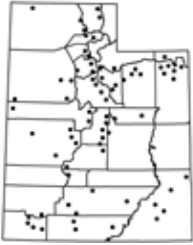
Habitat and range: *Mortonia scabrella* is uncommon in Utah, appears in limestone substrates, and is confined to lower elevations in Washington Co. It also occurs in Arizona, California, Nevada, New Mexico, Texas, and Mexico.

Comments: *Scabrella* means “somewhat rough,” referring to the leaves.

***Paxistima* Raf.**

Paxistima means “thick stigma.”

Paxistima myrsinites (Pursh) Raf., Mountain lover



Description: Mountain lover is a pretty evergreen shrub that rarely grows to more than 8 dm tall. The leaves are opposite up to 33 mm long and 2–15 mm wide, elliptic lanceolate to elliptic oblanceolate, dark green and glossy above, and pale green below. The petioles are short. The leaf margins are crenate serrate to spinulose-serrulate. The flowers are small, reddish brown, and appear in April–August. The fruit is a capsule.

Habitat and range: Mountain lover occurs throughout the state of Utah in sagebrush, pinyon-juniper, mountainbrush, aspen-mixed conifer, and spruce-fir communities, at 1675–3210 m. It also is found in Arizona, California, New Mexico, and north to British Columbia.

Comments: *Paxistima myrsinites* has great landscape ornamental value. *Myrsinites* is Greek for “myrtle.”



CORNACEAE—Dogwood family

The dogwood family is widespread, but its most common in northern temperate regions and, usually, on moist soils. The plants are mostly trees and shrubs, with opposite branching. The leaves are simple and usually deciduous, providing beautiful displays of color in the fall. The flowers are usually small, with more conspicuous white bracts that subtend the flower. The ovary is inferior and produces a fleshy 2-seeded fruit when mature. The plants of this family often contain iridoid compounds and tissues containing calcium oxalate crystals. Many of its members have been cultivated as ornamentals. In Utah, only one native woody species occurs, *Cornus sericea*.

***Cornus* L.**

Cornus is Latin for “dogwood.”

***Cornus sericea* L., Red-osier dogwood**

Description: Red-osier dogwood grows up to 4 m tall on favorable sites. The plants are usually as broad as tall. The branches are bright red or orangish and subglabrous to strigulose. The older stems are gray or green and smooth. The leaves are up to 12 cm long, lanceolate, ovate, or elliptical, with acute or acuminate tips, green above, pale below, and strigulose. The flowers are abundant, in cymose inflorescences, and bloom in May–July. The sepals are 0.5 mm long, and the petals are white or cream colored, up to 3.5 mm long. The fruits are drupes, sometimes sparsely strigulose, up to 9 mm thick, and white at maturity.

Habitat and range: Red-osier dogwood occurs along stream courses in all Utah counties, at 1370–3050 m, and in most of North America.

Comments: Utah's plants belong to *Cornus sericea* subsp. *sericea*. Following fire, red-osier dogwood usually increases by vegetative propagation. It is used for landscaping because of its bright red stems and colorful fall leaves. Its extensive root system maintains stream stability and also makes it a good plant for revegetation following disturbance. Humans have utilized this plant for making snowshoes, baskets, toothbrushes, etc. *Sericea* refers to the long silky hairs on the leaves and young stems.



CROSSOMATACEAE—Crossosoma family

The crossoma family is mostly restricted to the United States and Mexico. Most plants are shrubs, subshrubs, and some small trees. Most members of this family have adaptations for arid environments, such as a reduced leaf surface, a thick blade with a strongly cutinized epidermis, and isolateral leaves with stomates on both surfaces. Only one woody species occurs in Utah, *Glossopetalon spinescens*.

***Glossopetalon* A. Gray**

Glossopetalon refers to the tongue-like petals.

***Glossopetalon spinescens* A. Gray, Greasebush**

Description: Greasebush is a medium-sized intricately branched shrub, growing up to 8 dm tall. The stems are angular, green when young, and usually thorny. The leaves are spirally arranged on the stems, simple, and up to 15 mm long and 4 mm wide, oblanceolate or elliptical, with entire margins. The flowers are inconspicuous, borne singly in the leaf axils, bloom in late March–early June, and produce scarious bracts or small leaves at their base. The sepals are up to 3 mm long. The petals are up to 7 mm long, white, and oblanceolate. The stamens are 10 per flower. The ovaries are superior, number from 1–5 per flower, and each produces 1 or 2 seeds. The follicles are up to 5 mm long and almost as wide.

Habitat and range: *Glossopetalon spinescens* occupies salt desert shrub, xeric sagebrush, Colorado Plateau shrub, and pinyon-juniper communities throughout Utah, at 1370–2320 m. It also occurs in Arizona, California, Colorado, Idaho, and Nevada.

Comments: Greasebush produces oils that, when burned, make a quick flame and heavy smoke. It is a highly variable species morphologically, and some authors recognize three varieties, *Glossopetalon spinescens* var. *aridum* M. E. Jones, *Glossopetalon spinescens* var. *microphyllum* N. H. Holmgren, and *Glossopetalon spinescens* var. *mionandrum* (Koehne) Trel. *Spinescens* means “somewhat spiny.”



ELAEAGNACEAE—Oleaster family

Most members of the oleaster family are native to temperate regions of Eurasia. Most are medium-sized trees or shrubs that are commonly thorny and have nitrogen-fixing bacteria in their roots. Some are used as ornamentals, and others become weedy and invasive. In Utah, this family is represented by one naturalized and four native woody species.

Elaeagnus L.

Elaeagnus is Greek for “marsh plant” and “olive tree.”

*Elaeagnus angustifolia** L., Russian olive*



Description: Russian olive is a large shrub to medium-sized tree that may grow up to 12 m tall. The bark on young stems is reddish brown, smooth, and shiny. The stems often bear stout sharp thorns. Leaves are alternate, simple, elliptic to lanceolate, up to 10 cm long and 3.8 cm wide, and nearly white, due to a dense covering of peltate scales. The flowers are strongly aromatic, yellow, up to 12 mm long, and somewhat pubescent, with stellate hairs, blooming in May–July. There are 4 stamens per flower. The fruits are silvery-colored drupes up to 2 cm long. At maturity, the fruits drop all pubescence and become glabrous and shiny brown.

Habitat and range: *Elaeagnus angustifolia* is planted throughout Utah and has become feral in many areas. It is native to Eurasia.

Comments: First introduced as an ornamental in the United States in the late 1800s, and reported in Utah in 1929, Russian olive is now a common component of riparian strips and irrigated pastures. It is considered a serious pest, crowding out native species. It has also negatively impacted the hydrology of the streams and rivers. *Angustifolia* means “narrow leaves.”

Elaeagnus commutata Bernh. ex Rydb., Silverberry



Photo by Sherel Goodrich



Description: Silverberry grows up to 2 m tall, with young brownish stems densely covered with peltate scales. The branches lack thorns. The leaves are alternate up to 7 cm long and 3 cm wide, elliptic to oblanceolate, with acute or rounded leaf tips and obtuse basally, and covered on both surfaces with silvery pubescence intermixed with brownish scales. The flowers appear in groups of 1–5 per leaf axil in June, and are up to 15 mm long, with yellow lobes. Each flower produces 4 stamens. The fruits are drupes, up to 10 mm long at maturity.

Habitat and range: *Elaeagnus commutata* is found along waterways in Daggett, Duchesne, and Summit cos., at 1830–2440 m. It also occurs throughout much of the northern United States.

Comments: *Commutata* means “changed” or “changing” and is used for a species similar to one that is already known.

***Shepherdia* Nutt.**

Shepherdia is named after John Shepherd, the first curator of the Liverpool Botanic Gardens in the early 19th century.

***Shepherdia argentea* (Pursh) Nutt., Silver buffaloberry**

Description: Silver buffaloberry grows to 1–3 m tall, with stems that bear large thorns. The young stems are silvery, due to abundant peltate scales. The deciduous leaves are opposite, petiolate, up to 6 cm long and 1.4 cm wide, oblong, and elliptic to lanceolate or oblanceolate, with a cuneate base and rounded to obtuse tips. The petioles are up to 12 mm long. The flowers are yellow, up to 4 mm long, and bloom in April–May. The fruit is drupe-like, up to 7 mm long, with a red succulent pericarp that is edible and tart.



Habitat and range: *Shepherdia argentea* grows along stream courses and in hummocky wetlands, at 1400–2290 m. It is known throughout Utah. It also occurs from British Columbia to Saskatchewan and southward to North Dakota, New Mexico, Nevada, and California.

Comments: It is reported that the common name, buffaloberry, comes from the use early travelers made of this plant, as they mixed it with buffalo meat to make a tangy edible meal. *Argentea* means “silvery.”

Shepherdia canadensis (L.) Nutt., Soapberry



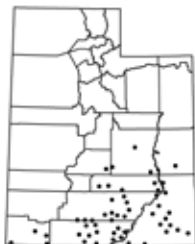
Description: Soapberry is a medium-sized shrub, growing up to 2 m tall. The young stems are covered with brown peltate scales. The leaves are opposite, ovate to lanceolate, up to 8 cm long and 3 cm wide, rounded both apically and basally, green above, and pale or brownish below. The flowers are up to 3 mm long, with brownish lobes, and are borne in the

upper leaf axils, either singly or in few-flowered clusters that bloom in May–early July. The fruits are succulent red drupes, up to 7 mm long at maturity.

Habitat and range: *Shepherdia canadensis* grows in open places in Douglas fir, aspen-mixed conifer, bristlecone pine, and spruce-fir woodlands. It is known from throughout Utah, at 1240–3205 m. Elsewhere, it is known from Alaska to the Atlantic seaboard and southward to New York; it is also found in Colorado, Oregon, and Nevada.

Comments: The fruits of soapberry contain saponins, making them bitter and soapy (thus the common name). *Canadensis* means “of Canada.”

***Shepherdia rotundifolia* Parry, Roundleaf buffaloberry**



Description: Roundleaf buffaloberry is a strikingly beautiful shrub, growing up to 2 m tall. The stems are white or pale yellowish when young, because of a dense covering of stellate pubescence. The leaves are opposite, up to 4.2 cm long and 3.8 cm wide, ovate to orbicular, sometimes rounded both apically and basally, silvery green above, and pale below, due to a dense pubescent covering. The flowers are up to 5 mm long, with yellowish lobes that spread widely, appear singly or in few-flowered clusters in the upper leaf axils, and bloom in March–May. The fruits are drupe-like, ellipsoidal, up to 8 mm long, and densely covered with stellate hairs at maturity.

Habitat and range: Roundleaf buffaloberry grows in Colorado Plateau shrub, salt desert shrub, pinyon-juniper, and ponderosa pine communities, below 2600 m. It is endemic to the Colorado Plateau and occurs across central and southern Utah, Colorado, and Arizona.

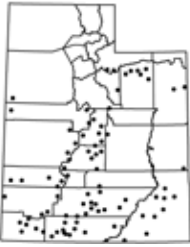
Comments: *Rotundifolia* means “round leaf.”

ERICACEAE—Heath family

The heath family has members all over the world, except in Australia. It is most common in cool-temperate and subtropical regions and on tropical mountains. Most members of this family prefer acidic soils, and they are dependent on symbiotic relations with fungal mycorrhizae. Many are important as ornamentals (rhododendrons and azaleas). Some have edible fruits, such as blueberries, cranberries, and huckleberries. Others have toxic compounds (*Rhododendron*), and medicinal uses are reported for some. Utah has 15 native woody species that include 7 genera.

***Arctostaphylos* Adans.**

Arcto means “bear” and *staphylos* means “tight cluster” (i.e., like a cluster of grapes).

***Arctostaphylos patula* Greene, Greenleaf manzanita**

Description: Greenleaf manzanita grows up to 1.5 m tall. It forms rounded shrubs, with ascending branches that have reddish brown bark, sharply contrasting with the foliage. The leaves are evergreen, leathery, alternate, glabrous or glandular, green or yellowish green, petiolate, up to 4.7 cm long and 4 cm wide, ovate, and elliptic to orbicular, with acute tips, round or truncate bases, and entire margins. The inflorescences are panicleate. The inflorescence branches are subglabrous and finely glandular. The flowers are pinkish white, urn shaped, usually have 10 small stamens enclosed within the flower, and bloom in February–April. The pedicels, calyx, and ovary are glabrous. The fruits are globose berries, brownish and up to 11 mm in diameter.

Habitat and range: Greenleaf manzanita is especially common in ponderosa pine communities throughout Utah, at 1370–2990 m. It also occurs in northwestern Arizona, California, Colorado, Montana, Nevada, western Oregon, and Baja Mexico.

Comments: *Arctostaphylos patula* is not resistant to fire; however, the seeds require fire or some other means of scarification to bring them out of dormancy. The leaves are often oriented perpendicular to the sun, which reduces sun exposure. The berries have been used for making jelly and cider. *Patula* means “wide spreading.”

***Arctostaphylos pringlei* Parry, Pringle’s manzanita**



Description: Pringle’s manzanita grows up to 2 m tall, forming attractive rounded shrubs with smooth reddish-brown branches. The young stems are glandular, with long spreading hairs. The leaves are evergreen, alternate, leathery, gray green, glandular, and elliptic to lanceolate, up to 4.2 cm long and 2.0 cm wide, with acute to obtuse tips, rounded to truncate bases, and entire margins. The petioles are well developed. The twigs, pedicels, calyx, ovary, and branches of the inflorescence are covered with gland-tipped hairs. The flowers are borne in panicles or racemes and bloom in May or June. The petals are pink, urn shaped, and up to 8.5 mm long. The berries are ovoid, glandular hairy, and up to 10 mm thick at maturity.

Habitat and range: Pringle’s manzanita occurs primarily in pinyon-juniper and mountainbrush communities. In Utah, it is found only in Washington Co., at 1840–2750 m. It also grows in Arizona, California, and Nevada.

Comments: The soft, spreading, gland-tipped hairs help distinguish *Arctostaphylos pringlei* from *A. pungens* and *A. patula*. *Pringlei* is named after Cyrus Guernsey Pringle, a 19th-century American botanist and prolific plant collector.

Arctostaphylos pungens Kunth, Point-leaf manzanita

Description: Point-leaf manzanita grows up to 2 m tall with smooth reddish-brown bark. The young stems are covered with white hairs. The leaves are evergreen, alternate, green, and up to 4.7 cm long and 3.2 cm wide, ovate to oblong, with acute or rounded tips and rounded or acute bases. The margins are entire. The petioles are distinct and canescent. The axis of the inflorescence is canescent and, rarely, glandular. The inflorescences are usually racemose, but occasionally paniculate. The corollas are urn shaped, pinkish, up to 8.5 mm long, and bloom in February–April. The fruits are glabrate ovoid berries, up to 8 mm wide, and reddish when mature.

Habitat and range: Point-leaf manzanita occurs in mountainbrush and open ponderosa pine forests in the southern part of Utah, in Kane, San Juan, and Washington cos., at 1000–2200 m. It also grows throughout the Sonoran Desert in the American Southwest.

Comments: *Arctostaphylos pungens* does not resprout after fire. It is likely that hybrids between *A. pungens* and *A. patula* occur where their ranges overlap. *Pungens* means “sharp pointed.”

Arctostaphylos uva-ursi (L.) Spreng., Kinnikinick

Description: Kinnikinick is the smallest member of this genus in Utah, growing to only 10 cm tall. The prostrate branches sometimes root at the nodes and are brownish with age. The leaves are evergreen, alternate, glabrous or pubescent, and oblanceolate to spatulate, up to 2.7 cm long and 1.3 cm wide, with acute bases and rounded tips. The inflorescences are racemose and glandular. The flowers are urn shaped, 5.2 mm long, pinkish, and bloom in June–July. The fruits are globose berries, up to 11 mm thick, and red at maturity.



Photo by Jim Harris



Habitat and range: *Arctostaphylos uva-ursi* occurs in the understory of coniferous forests throughout Utah, at 2140–3510 m. It grows widely elsewhere in North America.

Comments: The berries are eaten by grouse, bear, and other wildlife. *Uva-ursi* means “bear’s grape.”

Chimaphila Pursh

Chimaphila means “winter loving.”

Chimaphila menziesii (R. Br.) Spreng., Menzies’ chimaphila



Description: Menzies’ chimaphila is a low shrub, with creeping rhizomes, that grows up to 1.5 dm tall. The leaves are alternate or sometimes appearing whorled, lance-ovate to ovate, up to 3 cm long, with serrulate margins, dark green above, and usually pale beneath. The flowers are regular and borne 2–3 each in pedunculate umbellate corymbs, have white petals up to 6 mm long, and bloom in May–April. The sepals are rounded, with erose margins. The fruit is an erect capsule.

Habitat and range: *Chimaphila menziesii* grows in juniper, mountainbrush, ponderosa pine, and Douglas fir communities in Iron and Washington cos., at 1585–2075 m.

Comments: *Menziesii* is named after Archibald Menzies, a 19th-century Scottish botanist and naturalist on the Vancouver Expedition.

Chimaphila umbellata (L.) W. P. C. Barton, Pipsissewa

Description: Pipsissewa is a small subshrub that may grow up to 3 dm tall. The stems are glabrous and woody only at the base. The leaves are glabrous, shiny above and pale beneath, and up to 6 cm long and 1.5 cm wide, elliptical to oblanceolate, with cuneate bases and sharply serrate margins. The flower peduncles are up to 10 cm long, glabrous to minutely glandular, and often tinted red purple. The pedicels are pubescent or

glandular pubescent. The 4–10 flowers are borne in umbellate clusters and bloom in July–August. The calyx is erose ciliate. The petals are pink and up to 7 mm long. The stamens arise from expanded filaments. The capsules are erect and up to 7 mm wide.



Habitat and range: *Chimaphila umbellata* grows in ponderosa pine, aspen-mixed conifer, lodgepole pine, and spruce-fir communities in Beaver, Daggett, Duchesne, Garfield, Juab, Millard, Piute, Salt Lake, Sanpete, Summit, Uintah, Utah, and Washington cos., at 2195–3050 m. It also occurs in Alaska, California, Colorado, New Mexico, Washington, and the eastern United States.

Comments: *Umbellata* means “with an umbel.”

***Gaultheria* L.**

Gaultheria is named after Jean François Gaultier, an 18th-century French-Canadian botanist.

***Gaultheria humifusa* (Graham) Rydb., Alpine wintergreen**

Description: Alpine wintergreen is a prostrate subshrub that sometimes roots at the nodes. The stems rarely grow up to 1 dm tall. The leaves are alternate, thin, serrulate, and up to 15 mm long and 13 mm wide, ovate, oval, or elliptic, with obtusely rounded leaf bases and tips. The flowers, borne singly in the leaf axils, are up to 4 mm long, campanulate, and appear in late June–August. The fruits are subglobose berries, up to 7 mm in diameter, and red at maturity.

Habitat and range: Alpine wintergreen forms a ground cover associated with coniferous forest communities in Utah’s Uinta Mountains, in Daggett, Duchesne, Summit, Uintah, and Wasatch cos., at 2900–3355 m, as well as elsewhere in western North America.



Comments: The leaves and fruits of *Gaultheria humifusa* contain oil of wintergreen, which has been used for flavoring in gum, candies, and medicines. *Humi* means “ground” or “soil” and *fusa* means “spreading.”

***Kalmia* L.**

Kalmia is named after Pehr Kalm, an 18th-century Swedish botanist and student of Linnaeus.

***Kalmia microphylla* (Hook.) A. Heller, Bog laurel**



Description: Bog laurel is an evergreen subshrub. The leaves are opposite, leathery, elliptical, up to 18 mm long and 8 mm wide, with entire, revolute margins, shiny, and usually lighter green below than above.

The flowers appear in 2–6 flowered corymbs. The corollas are deep pink, up to 14 mm wide, bowl shaped, and appear in July–August. The ovaries are superior, and the fruits are septicidal capsules, with 5 locules.

Habitat and range: Bog laurel occurs in Daggett, Duchesne, Salt Lake, Summit, and Uintah cos, at 2900–3750 m and widely elsewhere in North America.

Comments: The leaves of *Kalmia microphylla* are considered poisonous both to livestock and humans. *Microphylla* means “small leaves.”

***Pyrola* L.**

Pyrola means “leaves like a pear.”

***Pyrola secunda* L., Secund wintergreen**

Photo by Sherel Goodrich



Description: Secund wintergreen is a subshrub, with stems that are woody only at the base, and it rarely grows over 2 dm tall. The leaves are primarily basal, evergreen, and seldom more than 5 cm long, ovate or elliptic, and rounded or acute basally, with crenate-serrate margins. The petioles are up to 2 cm long. The flowers are borne on racemes that produce up to 15 blossoms, arranged along 1 side of the inflorescence, and bloom in June–August. The sepals are up to 1.5 mm long. The petals are up to 6 mm long and greenish white. The styles extend beyond the corolla. The fruit is a pendulous capsule, 4–5 mm wide.

Habitat and range: *Pyrola secunda* is found in all Utah cos except Davis, Iron, Morgan, and Weber cos, at 2010–3420 m. It is found in mountainbrush, ponderosa pine, aspen-mixed conifer, and spruce-fir communities. It is also known from many locations in North America and Eurasia.

Comments: *Secunda* refers to the arrangement of the flowers on only one side of the axis.

***Rhododendron* L.**

Rhodon means “rose” and *dendron* means “tree.”

***Rhododendron neoglandulosum* Harmaja, Labrador tea**

Description: Labrador tea grows up to 1.5 m tall, with branches that are puberulent and glandular when young. The leaves are alternate, evergreen, and up to 3.4 cm long and 1.4 cm wide, elliptic to oblong, and acute at both tips and at the base. The leaf margins are somewhat revolute. The flowers appear in late June–August and are white, up to 5 mm wide, and rotate, with petals that are fused at the base and borne in terminal corymbs. The fruits are septicidal capsules, up to 6 mm long, puberulent, and glandular.



Habitat and range: Labrador tea occurs along streams, lake margins, bogs, and wet meadows in northern and western Utah, at 2600–3295 m, and throughout western North America.

Comments: The leaves of this species have been used for making tea. *Rhododendron neoglandulosum* is a recent name change for *Ledum glandulosum*. *Neo* is Greek for “new” or “recent” and *glandulosum* means “with glands.”

***Vaccinium* L.**

Vaccinium is Latin for “whortleberry.”

All *Vaccinium* species are considered good browse for deer and other wildlife, and the berries of most species are edible to wildlife and humans. Most species in the genus prefer acidic soils and are absent in many of the calcareous mountain ranges of Utah.

***Vaccinium caespitosum* Michx., Dwarf whortleberry**



Description: Dwarf whortleberry is a small subshrub that is rarely more than 3 dm tall. The twigs are brownish, more terete than angled, and glabrous to puberulent. The plant forms dense patches from woody

rhizomes. The leaves are deciduous, alternate, thin, and up to 4 cm long and wide, oblanceolate to obovate, with tips that are obtuse or occasionally acute, and bases that are usually cuneate. The leaf margins are serrulate from the tip to below the middle. The flowers appear singly in the leaf axils, are white or pinkish, with a urn-shaped corolla, and bloom in June–August. The berries are bluish to black, glaucous, up to 8 mm wide, sweet, and palatable.

Habitat and range: *Vaccinium caespitosum* occurs in coniferous forests and along sedge meadows throughout Utah, at 2225–3420 m, and widely across North America.

Comments: *Caespitosum* means “tufted.”

***Vaccinium membranaceum* Douglas ex Torr., Mountain whortleberry**



Description: Mountain whortleberry is a small shrub, up to 7 dm tall, with freely branching twigs that are rounded, usually glabrate, and brownish on younger stems. The leaves are alternate, and up to 7 cm long and 3.5 cm wide, elliptical or, less commonly, ovate or obovate, with acute or obtuse tips and a round base. The leaf margins are serrate. The urn-shaped flowers arise singly in the leaf axils, are yellowish pink, up to 6 mm long, and bloom in June–July. The fruits are ovoid, up to 9 mm wide, and glaucous purple at maturity.

Habitat and range: *Vaccinium membranaceum* grows in coniferous forests and lake borders, at 2500–3150 m, in the mountains of Cache (where rare), Carbon, Duchesne, San Juan, Summit, and Wasatch cos. It also occurs in much of northwestern North America.

Comments: Mountain whortleberry is a favorite food of bears, and it is highly sought out for human consumption in the Pacific Northwest, where it is more common. *Membranaceum* means “membrane-like.”

Vaccinium myrtillus L., Blue whortleberry

Photo by Richard Shaw © Intermountain Herbarium, USU



Description: Blue whortleberry is a small shrub, growing up to 3 dm tall, with branches that are green, initially sharply angled, and puberulent. The leaves are deciduous, alternate, and up to 4 cm long and 16 mm wide, ovate, lanceolate, or elliptical, with acute or obtuse tips, a rounded base, and serrulate margins. The urn-shaped flowers are pink, up to 5 mm long, and borne singly in the leaf axils, blooming in June–July. The berries are blue and up to 8 mm wide at maturity.

Habitat and range: Blue whortleberry grows in aspen-mixed conifers forests and clearings, at 2285–3510 m, in northern and southeastern Utah. It also occurs in much of western North America.

Comments: *Vaccinium myrtillus* resembles *V. scoparium* in having bright green angled stems, and it differs in having blue or black fruits and larger leaves. *Myrtillus* means “myrtle-like.”

Vaccinium scoparium Leiberg ex Coville, Red whortleberry

Description: Red whortleberry may grow up to 2.5 dm tall, with numerous twigs that are bright green, broom-like, sharply angled, and glabrous. The leaves are alternate, deciduous, and up to 1.5 cm long and 7 mm wide, ovate, with acute to rounded tips, obtuse bases, and serrulate margins. The flowers are urn shaped, pinkish, up to 3.5 mm long, and borne singly in the leaf axils, blooming in June–August. The berries are red and up to 6 mm wide.

Habitat and range: *Vaccinium scoparium* occurs in forests dominated by lodgepole pine or spruce-fir in the mountains of northern Utah, at 2500–3508 m, and elsewhere in western America.



Comments: Red whortleberry is a favorite food of grouse. The berries are rather tart, yet palatable to humans. *Scoparium* means “thin branches” or “broom-like.”

***Vaccinium uliginosum* L., Bog whortleberry**



Description: Bog whortleberry is a moderate-sized, erect, rounded shrub, growing up to 6 dm tall. The stems are glabrate to puberulent and brownish in their first year of growth. The leaves are alternate and oblanceolate, up to 21 mm long and 12 mm wide, the margins entire, the leaf tips rounded, and the bases acute. The flowers are borne in groups of 2–4 in the leaf axils and are urn shaped, pinkish, up to 6 mm long, and mostly 4 merous, blooming in mid-June–August. The berries are blue glaucous and up to 6 mm wide.

Habitat and range: *Vaccinium uliginosum* occurs in bogs, swamps, and moist woods in the mountains of Duchesne, Morgan, Summit,

Wasatch, and Weber cos. It is associated with aspen-mixed conifer and spruce-fir forests, at 2800–3510 m, and is circumboreal.

Comments: *Uliginosum* means “swampy,” “marshy,” or “moist.”



FABACEAE—Legume or pea family

Fabaceae is among the largest flowering plant families, along with Orchidaceae and Asteraceae. Most members of this family produce legumes, have a superior ovary, and have 10 stamens. Many of its members host nitrogen-fixing bacteria in their root nodules, allowing them to live in nitrogen-poor environments, as well as often being used in crop rotation programs, alternating with grasses to replenish the soils. Most legumes are high in protein, and they are of major economic importance as a food source for humans (peanuts, peas, beans, lentils, soy beans) and domestic animals (alfalfa), and as ornamentals (wisteria and sweetpeas). Many are well adapted to arid environments. Some members have toxic properties (e.g., rotenone, used for rat poison) and should not be eaten. Others, such as kudzu (*Pueraria lobata*) and various brooms (*Cytisus*), have become invasive and are targets of mass removal programs. In Utah, there are 12 native woody species.

Acacia Mill.

Acacia means “point” or “thorn.”

Acacia greggii A. Gray, Catclaw acacia



Description: Catclaw acacia is a large shrub or small tree, growing up to 4 m tall. The young branches are armed with stout, curved, very sharp thorns that are up to 6 mm long. The leaves are twice pinnate and up to 4 cm long, with secondary leaflets that are 3–7 mm long. There are 2–3 pairs of primary leaflets and usually fewer than 10 pairs of secondary leaflets. The leaflets are pubescent on both surfaces. The petioles are up to 5 mm long and bear a large gland between the lower pair of pinnae. The flowering spikes are up to 6 cm long. The flowers are fragrant, up to 2.5 mm long, with greenish pale yellow petals, and appear in April. The fruits are flattened legumes, up to 10 cm long, usually curved, and sometimes up to 2 cm wide at maturity. The pods are constricted between the seeds. The seeds are rounded and up to 7 mm in diameter.

Habitat and range: Catclaw acacia occurs in Mojave Desert shrub communities in Washington Co., at 760–1000 m. It is also known from Arizona, California, Nevada, Texas, and Mexico.

Comments: Individual plants may live to 200 years or more. They are deep rooted and drought resistant. Fire suppression and overgrazing have increased the abundance of *Acacia greggii* in some areas. It is an important bee plant and a host plant to California mistletoe. *Greggii* honors Josiah Gregg, a naturalist, trader, and explorer of the southwestern United States.



Cercis L.

Cercis is Greek for “redbud.”

***Cercis occidentalis* Torr. ex A. Gray, Western redbud**



Description: Western redbud grows up to 3.5 m tall on more favorable sites, but it is usually a small multistemmed tree or large shrub. The leaves are palmately veined, and up to 7 cm long and to 10 cm wide, suborbicular to reniform, and cordate basally, with rounded obtuse to emarginate tips. The leaf surfaces are glabrous, or hairy at the vein axils on the lower leaf surface. The flowers occur in clusters on the lateral spur branches and bloom in early March–May, before the leaves appear. The petals are up to 8 mm long, weakly papilionate, and deep pink. The calyx is asymmetrical and up to 4.5 mm long. The fruits are flattened pods, up to 10 cm long and 2 cm wide.

Habitat and range: *Cercis occidentalis* grows in shaded sandstone and limestone canyons and alcoves in Garfield, Kane, San Juan, and Washington cos., at 770–1230 m. Elsewhere, the variety *Cercis occidentalis* var. *orbiculata* (Greene) Tidestr. is known from Arizona, California, Nevada, and New Mexico.

Comments: The common landscape ornamental known as redbud, *Cercis canadensis* var. *canadensis* L., is a close relative of our native species. *Occidentalis* means “of the west.”

Lotus L.

Lotus is Latin for “juicy-fruited shrub.”

***Lotus rigidus* (Benth.) Greene, Broom lotus**

Description: Broom lotus is a subshrub, woody only at the base. The stems are erect or ascending, and may be up to 7 dm tall. The leaves are alternate, compound pinnate, and petiolate. The stipules are reduced to glands. The leaf rachis is flattened and bears 2–5 leaflets that are up to 2 cm long and 0.2 cm wide, oblong to oblanceolate, and obtuse to emarginate terminally. The flowering peduncles are up to 14 cm long, with bracts that may be 3-foliate. The flowers are 1–3 per inflorescence, yellow suffused with red, and up to 23 mm long. They bloom in late March–May. The pods are narrowly oblong, up to 4.5 cm long and to 4.5 mm wide, straight, and glabrous.

Habitat and range: Broom lotus grows in rocky areas or cliff ledges in Mojave Desert shrub and pinyon-juniper communities in Washington Co., at 750–1450 m. Elsewhere, it is known from Arizona, California, Nevada, and Mexico.

Comments: The flowers and pods of *Lotus rigidus* are eaten by desert tortoises. *Rigidus* means “rigid” or “stiff.”

***Parryella* Torr. & A. Gray**

Parryella is named after Charles Christopher Parry, a 19th-century British-born American botanist and student of John Torrey, Asa Gray, and George Engelmann.

***Parryella filifolia* Torr. & A. Gray ex A. Gray, Narrow-leaf dunebroom**

Description: Narrow-leaf dunebroom is a shrub, growing up to 1.5 m tall, with stems that are unarmed. The leaves are alternate, compound pinnate, up to 13 cm long, with chestnut brown stipules up to 2 mm long, and have up to 40 leaflets. The leaflets are up to 21 mm long and linear, with involute margins and glabrous or strigose surfaces. The flower peduncles are about 1 cm long and produce racemes that may be branched near the base, bearing up to 90 flowers per inflorescence and blooming in June–September. The sepals are up to 3 mm long and 10 ribbed near the base. Petals are lacking. The pods are short stipitate and up to 6.5 mm long and 3 mm wide, with prominent red blister glands.

Habitat and range: Narrow-leaf dunebroom occurs in dunes and sandy rock ledges, or on sandstone, in Grand and San Juan cos., at 1300–1590 m. It is also known from Arizona and New Mexico.



Comments: *Parryella filifolia* may be useful in the reclamation of sandy areas. *Filifolia* means “thread leaf.”

***Prosopis* L.**

Prosopis is Greek for “burdock.”

***Prosopis glandulosa* Torr., Honey mesquite**



Description: Honey mesquite is an armed shrub or small round tree that branches profusely near ground level. The plants may grow up to 5 m tall. The leaves are alternate, petiolate, with the rachis terminating as a spine, and compound pinnate, sometimes having up to 17 pairs of leaflets. The leaflets are oblong to narrowly oblong, up to 3.8 cm long and 4 mm wide, and glabrous on both sides, sometimes with ciliate margins. The spines are nodal and not prominent. The flowers appear in greenish or yellow spikes that are borne on spur branches in May–September. The ovaries

are pilose. The pods are stipitate, up to 20 cm long, and narrowly oblong to linear, often curved and subterete or somewhat flattened.

Habitat and range: Honey mesquite occurs in Mojave Desert shrub communities, usually on gravel deposits, in Washington Co., at 670–1220 m. It is also known from Arizona, Kansas, Nevada, New Mexico, Oklahoma, and Texas.

Comments: In Utah, our variety is *Prosopis glandulosa* var. *torreyana* (L. D. Benson) A. E. Murray. Deer, javelina, jackrabbits, and others feed on the pods and vegetation. It is a good honey plant as well as a source of nectar for butterflies. It is useful for stabilizing soils, as it is drought tolerant and produces roots up to 100 feet long. Honey mesquite increases under heavy grazing by domestic animals. The wood is hard and resistant to decay and termites. It is used for fuel for barbecues and for making bowls. This species has been an important plant for indigenous peoples, since the seeds were ground and used for flour and, if allowed to ferment, produced an intoxicating beverage. *Glandulosa* means “glandular” and *torreyana* refers to John Torrey, a 19th-century American botanist and teacher of Asa Gray.

***Prosopis pubescens* Benth., Screwbean mesquite**



Description: Screwbean mesquite grows up to 3.5 m tall. It is an armed plant, with erect to crooked stems that form rounded trees. The leaves are short petiolate and pinnately compound, with a rachis terminating as a stout spine. There are usually 2 primary leaflets per leaf, with up to 8 pairs of secondary leaflets. The leaflets are elliptic to oblong, and glabrous or puberulent. The paired stipular spines at the nodes are up to 2.5 cm long. The flowers appear in clusters or as solitary yellowish spikes, blooming in May–June. The ovaries are villous. The pods are coiled into tight woody cylinders up to 5 cm long and 6 mm wide, and they are diagnostic for this species.

Habitat and range: Screwbean mesquite grows along drainage ways, slope bases, and stream terraces in Mojave Desert shrub and salt desert shrub communities in Washington Co., below 1100 m. Elsewhere, it is known from Arizona, California, Nevada, New Mexico, Texas, and Mexico.

Comments: The coiled fruit of *Prosopis pubescens* resembles a cork-screw. The flowers provide pollen and nectar for bees and butterflies. The plant itself provides good cover and nesting sites for many birds. The wood is hard and durable. *Pubescens* means “with hairs.”

***Psorothamnus* Rydb.**

Psoro means “mangy” or “scabby” and *thamnus* means “shrub.”

***Psorothamnus arborescens* (Torr. ex A. Gray) Barneby, Mojave dalea**



Description: Mojave dalea is an armed shrub, up to 1 m tall. The branches are strigulose and sparsely glandular. The stipules are up to 2 mm long and awl shaped. The leaves are up to 3.8 cm long. The leaflets are up to 15 in number and 10 mm long and 1.5 mm wide, linear, oblanceolate, or ovate, glandular below, and strigose on both sides. The lateral leaflets are often confluent with the terminal peduncles. The lower flowers are borne in axillary racemes up to 4.5 cm long, with up to 21 flowers, and bloom in April–June. The floral bracts are up to 3.5 mm long, lanceolate or with a sharp awn or bristle. The calyx is 10 ribbed, villous, and up to 10 mm long, with tubes up to 5 mm long and teeth up to 5 mm long. The teeth differ markedly in width. The flowers are up to 11 mm long and indigo blue. The pods are conspicuously glandular dotted and minutely pilose.

Habitat and range: Mojave dalea is rare in Utah, and grows only in Colorado Plateau shrub communities, at 1280–1530 m, on sandstone in Kane Co. It also is known from Arizona, California, and Nevada, where it generally prefers granitic or volcanic bedrock.

Comments: Utah specimens are identified as *Psorothamnus arborescens* var. *pubescens* (Parish) Barneby and primarily occupy sandstone.

Mojave dalea is very similar to *P. fremontii*, but it differs from that species in having fewer glands on the pods and leaflets that are generally greener, with fewer hairs on the leaf surface. *Arborescens* means “tree-like” and *pubescens* means “with fine hairs.”

***Psorothamnus fremontii* (Torr. ex A. Gray) Barneby, Frémont’s indigo-bush**



Description: Frémont’s indigo-bush is an armed shrub, up to 1.5 m tall. The branchlets are strigose pubescent and only occasionally glandular. The leaves are up to 6.5 cm long and pinnately compound, with stipules up to 1.5 mm long. The leaflets are linear oblong to elliptic, up to 1.4 cm long and 0.6 cm wide, and both surfaces are strigose, but glands appear on the lower surface only. The upper leaflets may be confluent with the rachis. The flowers appear in axillary racemes up to 15 cm long, sometimes producing up to 40 flowers, and bloom in April–June. The rachis is strigose, with bracts up to 2 mm long that are lanceolate and glabrous. The calyx is up to 6.5 mm long, with the tubular portion up to 3.3 mm long and obscurely 10 ribbed. The petals are up to 12 mm long and indigo or, rarely, white. The pods are gland dotted.

Habitat and range: Frémont’s indigo-bush grows in Mojave Desert shrub, xeric sagebrush, Colorado Plateau shrub, and (sometimes) pinyon-juniper communities. It occurs in Garfield, Kane, San Juan, Washington, and Wayne cos., at 730–2270 m. Elsewhere, it is known from Arizona, California, and Nevada.

Comments: *Psorothamnus fremontii* is one of the most beautiful species of the Mojave Desert when in bloom. It is very similar to *P. arborescens*, but is much more widespread. *Fremontii* is named after John Charles Frémont, a naturalist and early explorer of the American West.

Psorothamnus nummularius (M. E. Jones) S. L. Welsh, Jones' indigo-bush

Description: Jones' indigo-bush may grow up to 3.5 dm tall. The stems are velvety, due to their short retrorse hairs, and conspicuously glandular, with orange or yellow glands. The stipules are vestigial. The leaves are compound pinnate, up to 3 cm long, and strongly glandular, with orange dots across the surface. The leaflets are usually up to 13 in number and up to 6.5 mm long and 5 mm wide, oval to obovate, strigose on both surfaces, and glandular below. The uppermost leaflets are often confluent with the rachis. The flowering racemes are pedunculate and produce up to 18 flowers that bloom in June–September. The calyx is 10 ribbed, with teeth up to 5 mm long and all similar. The petals are up to 9 mm long and indigo. The pods are almost as wide as long, dotted with conspicuous orange glands.

Habitat and range: *Psorothamnus nummularius* is a Utah endemic and occurs only in Emery Co., at 1270–1500 m, on Mancos shale or gravel terraces in salt desert shrub and Colorado Plateau shrub communities.

Comments: *Nummularius* means “to resemble a coin,” perhaps referring to the leaves of this plant.

Psorothamnus polydenius (Torr.) Rydb., Glandular indigo-bush

Description: Glandular indigo-bush may grow up to 1.5 m tall. The stems are velvety, with short retrorse hairs, bear yellowish or orange resinous glands when young, and have straight spines up to 1.5 cm long between the nodes. The leaves produce up to 13 leaflets that are up to 6.5 mm long and 5 mm wide, oval to obcordate, strigose on both surfaces, and glandular below. The upper leaflets are often confluent with each other and the rachis. The axis of the raceme is up to 2 cm long, with up to 18 flowers that bloom in June–September. The calyx is 10 ribbed,

with teeth up to 2.5 mm long, triangular, and similar to each other. The petals are indigo. The pods are strongly glandular dotted and only slightly longer than wide.



Habitat and range: *Psorothamnus polydenius* grows in Mojave Desert shrub communities, on soils derived from limestone and associated gravelly surfaces. It occurs only in the southwesternmost part of Washington Co., at 1075–1350 m. It is also known from California and Nevada.

Comments: *Polydenius* means “many teeth.”

Psorothamnus thompsoniae (Vail) S. L. Welsh & N. D. Atwood, Thompson’s indigo-bush



Description: Thompson’s indigo-bush may grow up to 8 dm tall. The young stems are velvety, with short retrorse hairs and distinct yellow or

orange glands. The stipules are up to 8 mm long. The leaves are pinnately compound and up to 5 cm long. The leaflets number up to 17 and are up to 10 mm long and 4 mm wide, linear to oblong, oval to obcordate, glandular and strigose above, and strigose or glabrate below. The uppermost leaflet is joined to the rachis. The flowering peduncles are up to 2 cm long. The racemes may have up to 25 flowers, and some flowers may be axillary. The flowers bloom in May–August. The calyx is 10 ribbed, glabrous, and up to 5 mm long, with a tube about 1/2 that length. The petals are up to 11 mm long and purple, pink, or indigo. The pods are almost as wide as long and bear conspicuous glandular dots.

Habitat and range: Thompson's indigo-bush is found in Colorado Plateau shrub and pinyon-juniper communities in southern Utah, at 1130–2270 m, and in northern Arizona.

Comments: Two varieties are recognized in Utah: *Psorothamnus thompsoniae* var. *thompsoniae* and *Psorothamnus thompsoniae* var. *whitingii* (Kerney & Peebles) Barneby. The latter has linear or linear-ob lanceolate leaflets 4–7 times longer than wide, a villous calyx tube, and is a Navajo Basin endemic, known only from San Juan Co. and adjacent Arizona. There, it grows in Monument Valley and on Navajo Mountain. *Whitingii* refers to A. F. Whiting, one of the collectors of the type specimen. *Psorothamnus thompsoniae* var. *thompsoniae* has obovate to oblanceolate leaflets 1.5–4 times longer than wide, a glabrous calyx tube, and grows in canyons of the Colorado River drainage in Emery, Garfield, San Juan, and Wayne cos. *Thompsoniae* honors Ellen Powell Thompson, a 19th-century American botanist and sister of John Wesley Powell.

Robinia L.

Robinia is named after Jean Robin, a botanist and arborist to France's King Henry IV in the late 16th to early 17th century.

Robinia neomexicana A. Gray, New Mexico locust

Description: New Mexico locust is a tree or large shrub, growing up to 8 m tall. The young stems are villous and rarely glandular. The leaves are alternate, odd-pinnately compound, up to 20 cm long, and produce up to 19 leaflets. The leaflets are up to 4 cm long and 2 cm wide, lance-oblong to oblong-obtuse, cuspidate, and lightly pubescent above and below, becoming glabrate on both surfaces. The petioles are villous near the base. The stipules are up to 10 mm long and often spiny. The peduncles are up to 4 cm long and glandular pubescent. The flowering racemes are up to 8 cm long, and produce up to 14 flowers that bloom in May–July. The flowers are pink to purple and up to 24 mm long. The calyx is campanulate, with a tube up to 5 mm long. The calyx teeth are triangular, acuminate, and up to 5 mm long. The pods are up to 8 cm long, glandular pubescent to hispid, or sometimes glabrous.



Habitat and range: New Mexico locust grows on shaded slopes and terraces along streams in mountainbrush and pinyon-juniper communities in Washington Co., at 850–1370 m. It also occurs in Arizona, Colorado, Nevada, New Mexico, Texas, and Mexico.

Comments: *Robinia neomexicana* is an important nitrogen fixer. It is drought tolerant and browsed by both wildlife and livestock. *Neomexicana* means “of New Mexico.”

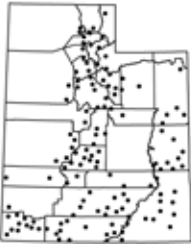


FAGACEAE—Oak or beech family

This family is composed of monoecious trees and shrubs widely distributed in temperate and subtropical regions of the Northern Hemisphere. The leaves are simple, alternate, and pinnate. The male flowers are usually produced in pendulous catkins and are wind pollinated. The fruit is a cup-like nut (acorn). Members of this family are used for lumber (oak, chestnut, beech), wine barrels, cork, firewood, and ornamentals. The fruits of some species have been used as food. The genus *Quercus* is the only genus native to Utah, and species within this genus readily hybridize.

***Quercus* L.**

Quercus is Latin for “oak.”

***Quercus gambelii* Nutt., Gambel oak**

Description: Gambel oak is a clonal deciduous shrub or tree, its size depending on the amount of moisture available. The bark is gray or brown and scaly. The leaf petioles are usually 10–20 mm long. The leaf blades are highly polymorphic and may be deeply or shallowly lobed. The flowers bloom in mid–late spring. The acorns are solitary or paired, usually up to 10 mm long.

Habitat and range: *Quercus gambelii* occurs in mountainbrush communities in all Utah counties except at 1125–2745 m, as well as in Arizona, Colorado, Nevada, New Mexico, Texas, Wyoming, and Mexico.

Comments: Gambel oak forms numerous hybrids with other native oaks, which often complicates field identification. Some authors recognize two varieties that occur in Utah: *Quercus gambelii* var. *gambelii* and *Quercus gambelii* var. *bonina* S. L. Welsh. Gambel oak reproduces vigorously from root sprouts (lignotubers) following fire, heavy browsing, or other disturbances. Deer may browse it significantly, but the high tannin content can be hard on cattle. The acorns are an important food source for

squirrels, jays, turkeys, and other wildlife. Gambel oak is often thinned or cleared away from homes because it is prone to fire and very combustible. It is also commonly infested with canker worms that may defoliate the trees. *Gambelii* is named after William Gambel, an early naturalist and collector in the western United States in the 19th century.

***Quercus havardii* Rydb., Havard Oak**



Description: Havard oak is a low-growing, rhizomatous, clonal, deciduous oak. The leaf blades are green, often turning brown with age, and polymorphic, with somewhat undulate margins. The leaf surfaces may be densely grayish or yellowish tomentulose or stellate-pubescent, with 2–3 rounded teeth on each side and a broadly rounded apex. The leaf petioles are up to 7 mm long. The flowers bloom in the spring. The acorns are solitary or paired, usually over 15 mm long and about as wide.

Habitat and range: Havard oak occurs most commonly in deep, shifting or stabilized sand dunes or sandy soils in southeastern Utah, below 1500 m. It is more common in New Mexico, Oklahoma, and Texas.

Comments: Like all our native oaks, *Quercus havardii* forms hybrids with *Q. turbinella* and *Q. gambelii* and some authors choose to treat these hybrids as varieties or species. Havard oak helps stabilize sandy soils. *Havardii* honors Valéry Havard, a mid-19th- to early 20th-century American botanist.

Quercus turbinella Greene, Dixie live-oak



Description: Dixie live-oak grows to 4 m tall and is an evergreen clonal species. The leaves are lanceolate to suborbicular, up to 4 cm long and 2.4 cm wide, bearing up to 6 pairs of lateral spines along the margins. The male catkins are up to 3 cm long and appear in the spring. The involucre cups of the acorns are up to 8 mm long and 14 mm wide. The acorns are up to 24 mm long and 10 mm wide.

Habitat and range: Dixie live-oak grows in mountainbrush and pinyon-juniper communities in Kane, San Juan, and Washington cos., at 820–1710 m. It is also known from Arizona, California, Colorado, Nevada, New Mexico, Texas, and Mexico.

Comments: *Quercus turbinella* forms hybrids with *Q. gambelii*, *Q. havardii*, and others. *Turbinella* means “shaped like a little top.”



GARRYACEAE—Silk-tassel family

The silk-tassel family consists mostly of evergreen dioecious shrubs and trees with simple, opposite, and leathery leaves. The flowers are borne in long catkins, and the fruits are 2-seeded berries. Only one representative of this family is native to Utah.

Garrya Douglas ex Lindl.

Garrya is named after Nicholas Garry, a deputy-governor of the Hudson Bay Company in the early 19th century.

***Garrya flavescens* S. Watson, Silk-tassel bush**

Description: Silk-tassel bush grows up to 3.5 m tall. The foliage is grayish and pubescent. The leaves are evergreen and ovate to broadly elliptic, up to 6 cm long and 3.5 cm wide. The petioles are up to 10 mm long. The catkins are densely silky pubescent, up to 5 cm long, and bloom in January–February. The fruits are silky ovoid berries up to 8 mm long.

Habitat and range: Silk-tassel bush grows in pinyon-juniper, ponderosa pine, and southern mountainbrush communities in Washington co., at 1300–2745 m. It is also known from Arizona and Nevada.

Comments: *Garrya flavescens* is an attractive plant with possible landscape potential. *Flavescens* means “yellowish.”



GROSSULARIACEAE—Currant or Gooseberry family

This family is composed primarily of woody shrubs and trees. The stems are often spiny and produce leaves that are mostly alternate and simple, but often deeply lobed. The flowers are usually 5 merous, with an inferior ovary, a single style, and often with a prolonged hypanthium. The fruits are berries. The plants in this family are cultivated for food and ornamentals. and the family is distributed worldwide. The term gooseberry often refers to plants that have nodal spines and internodal bristles; currants mostly lack nodal spines and internodal bristles. In Utah, only one woody genus occurs, *Ribes*, with 12 species.

***Ribes* L.**

Ribes is Arabic for “plant with sour sap.”

All members of the genus *Ribes* are alternate host plants for the white pine blister rust.

***Ribes aureum* Pursh, Golden currant**

Description: Golden currant is a beautiful shrub that grows up to 3 m tall. The leaves are deciduous, simple, alternate, dark green, shiny, palmately veined, and 3 lobed, with entire margins. The elegant yellow tubular flowers, up to 12 mm long, are produced in abundance, appearing in late March–early July. The fruit is a tasty berry, red to black, 5–7 mm wide, and glabrous.

Habitat and range: Golden currant occurs along drainage ways and moist meadows on valley floors, at up to 2500 m, in many plant communities throughout Utah, except for Grand and San Juan cos. It also is found from Canada to California and New Mexico.

Comments: *Ribes aureum* is browsed by rabbits, deer, sheep, and elk. The species is easily propagated and commonly used as an ornamental and for restoration projects. The fruits are eaten fresh or dried. *Aureum* means “gold.”

***Ribes cereum* Douglas, Wax currant**



Description: Wax currant is a moderate shrub, up to 1.5 m tall, rounded in form, unarmed, and deciduous. The leaves are alternate, up to 3 cm wide, and orbicular or reniform, with 3–7 shallow lobes. The leaf surfaces are glabrous to stipitate glandular. The flowers are small and borne 2 or 3 at a node, appearing in April–August. The petals are white or pinkish and up to 2 mm long. The berries are reddish, with short stipitate glands.

Habitat and range: Wax currant is found in many plant communities throughout Utah, at 1520–2510 m, and in much of western North America.

Comments: Our plants belong to *Ribes cereum* var. *inebrians* (Lindl.) C. L. Hitchc. *Cereum* means “waxy” and *inebrians* means “making drunk.”

***Ribes hudsonianum* Richardson, Northern black currant**

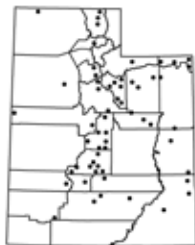
Description: Northern black currant is an unarmed strongly aromatic shrub that grows up to 1.5 m tall. The leaves are orbicular to obovate, with crystalline yellowish glands. The blades are about 8 cm long and to 12 cm wide, strongly 3 lobed, and doubly dentate. The petioles are 2.7–8 cm long, with sessile, round, yellow glands. The racemes are 20–50 flowered, erect to spreading. The flowers are white and bloom in April–August. The berries are blackish, bitter, and glabrous, with sessile glands.



Habitat and range: Northern black currant grows along streamsides in aspen-mixed conifer and spruce-fir communities in Box Elder, Duchesne, Salt Lake, Summit, Utah, and Wasatch cos., at 1830–2595 m. It also occurs in much of western and northern North America.

Comments: Utah plants belong to *Ribes hudsonianum* var. *petiolare* (Douglas) Jancz. *Hudsonianum* refers to Hudson Bay, and *petiolare* refers to the petiole.

***Ribes inerme* Rydb., Whitestem gooseberry**



Description: Whitestem gooseberry is an erect to sprawling deciduous shrub, up to 2 m tall. The plant usually has 1–3 nodal spines, or the spines may be absent. The internodal bristles are usually absent. The stems are smooth and gray or white. The leaves are cordate to orbicular, with 3–5 lobes, and have crenate to dentate margins. The leaf surfaces are glabrate,

with veins that are sometimes strigose hairy. The flowers are up to 12 mm long, greenish white, tubular or campanulate, and appear in April–July. The styles are pilose-villous. The berries are globose, reddish to purple, and succulent.

Habitat and range: Whitestem gooseberry grows in moist environments, usually with willows, at 1830–3390 m. It occurs throughout Utah and in much of the western mountainous regions of the United States and Canada.

Comments: *Ribes inerme* is recognized by its pilose styles, tubular hypanthium, and glabrous filaments. *Inerme* means “smooth.”

Ribes lacustre (Pers.) Poir., Swamp gooseberry



Description:

Swamp gooseberry is a deciduous shrub, growing up to 1.5 m tall, with prickly stems. The leaves may be up to 8 cm wide, are orbicular, with 5 lobes and crenate margins,

and more or less glabrate, with sparsely hairy veins. The flowers are inconspicuous, pinkish to yellowish green, and bloom in May–August. The berries are red to black, covered with stipitate glands, and considered unpalatable.

Habitat and range: *Ribes lacustre* occurs in Utah's northern counties, in riparian, aspen-mixed conifer, and spruce-fir communities, at 2100–3350 m. It also is found in much of western and northern North America.

Comments: *Lacustre* means “pertaining to lakes.”

Ribes laxiflorum Pursh, Trailing black currant



Description: Trailing black currant is a small unarmed shrub, growing up to 7 dm tall. The leaves are deciduous, orbicular, up to 6.5 cm wide, 3–5 lobed, with crenate or dentate margins, and have stipitate glands, especially toward the base. The flowers are inconspicuous, produced in loose racemes, and appear in June–early August. The berries are blackish when ripe and covered with purplish stipitate glands.

Habitat and range: In Utah, trailing black currant occurs only in the Deep Creek Mountains, at about 2600 m, where it prefers wet shady places in spruce-fir forests with boulders and wind-thrown trees. It is common along the Pacific coast of North America.

Comments: Some authors suggest that *Ribes laxiflorum* should include *R. coloradense*, which broadens the distribution to include the Rocky Mountains. *Laxiflorum* means “loose flowers.”

***Ribes leptanthum* A. Gray, Trumpet gooseberry**



Description: Trumpet gooseberry grows up to 2 m tall and is armed at the nodes. The deciduous leaves are up to 1.6 cm wide and orbicular, with 5 glabrate to sparsely pubescent lobes. The racemes are 1–3 flowered. The flowers are up to 5.5 mm long, whitish in color, and bloom in April–late June. The hypanthium is a cylindrical tube, 3–6 mm long. The berries are up to 10 mm wide, blackish and glabrate.

Habitat and range: *Ribes leptanthum* occurs throughout central and southern Utah, at 1830–2870 m, in pinyon-juniper, mountainbrush, ponderosa pine, and spruce-fir forests, as well as in sedge meadows in that zone. It also is found in Arizona, Colorado, New Mexico, and Texas.

Comments: *Leptanthum* means “thin flowered.”

***Ribes montigenum* McClatchie, Mountain gooseberry**



Description: Mountain gooseberry is a shrub, 0.7–1.5 m tall, with 1–5 nodal spines and sparse to dense internodal bristles. The leaves are orbicular, 5 lobed, and densely pubescent or stipitate glandular. The flowers are essentially tubeless, up to 6 or 7 mm wide, with yellowish to pinkish disks, and appear in late April–August. The berries are red, up to 10 mm wide, and covered with stipitate hairs.

Habitat and range: Mountain gooseberry is common throughout Utah in sagebrush-grass, aspen-mixed conifer, Douglas fir, and spruce-fir forests, at 2135–3660 m. It also occurs in much of the western United States and British Columbia.



Comments: Spines, a shallow hypanthium, glabrous styles, densely pubescent leaves, and (usually) purplish-red stipitate glandular hairs on the berries help identify *Ribes montigenum*. *Montigenum* means “of the mountains.”

Ribes oxyacanthoides L., Inland gooseberry



Description: Inland gooseberry is a deciduous shrub, growing up to 2 m tall. The stems have 1–3 spines per node, and the internodes are often bristly. The leaves are orbicular, up to 6 cm in diameter, with a cordate base, and usually 5-lobed, with crenate to dentate margins. The leaf surface is pilose to villous, often glandular. The flowers have glandular ciliate bracts. The petals are greenish white to white, usually glabrous, and appear in late April–July. The berries are succulent and reddish, purple, or blackish.

Habitat and range: Inland gooseberry occurs at in northern Utah, at 2130–2750 m, in wet sites dominated by alder, birch, willows, or aspen. Its range extends north and east from Alberta to the Great Lakes region.

Comments: The Utah plants are treated as *Ribes oxyacanthoides* var. *setosum* (Lindl.) Dorn. *Oxyacanthoides* means “sharp spined” and *setosum* means “with bristles.”

Ribes velutinum Greene, Desert gooseberry

Description: Desert gooseberry grows up to 2 m tall, has 1–2 nodal spines, and lacks internodal bristles. The leaves are simple, alternate, up to 2 cm wide, and roughly orbicular, with 3–5 shallow lobes. The racemes bear 1–2 small white or yellow flowers, with glabrous styles, appearing in late March–early August. The hypanthium is a cylindrical tube less than 2.8 mm long. The berries are up to 8 mm long, reddish or purple, and glabrous or sometimes hirsute.

Habitat and range: Desert gooseberry grows in canyon slopes and washes throughout western and southwestern Utah in sagebrush-grass, pinyon-juniper, mountainbrush, and ponderosa pine communities, at

1340–2321 m. It occurs in Beaver, Iron, Kane, Millard, Tooele, and Washington cos. It also is found in Arizona, California, Idaho, Oregon, and Washington.



Comments: Our plants belong to *Ribes velutinum* var. *velutinum*. *Velutinum* means “velvety,” referring to the pubescence on the leaf, which can be extremely variable.

Ribes viscosissimum Pursh, Sticky currant



Description: Sticky currant grows up to 2 m tall and is unarmed. The internodes are hirsute and stipitate glandular. The leaves are stipitate glandular and orbicular, up to 10 cm wide, with up to 7 shallow lobes, cordate bases, and dentate or crenate margins. The flowers may be up to

9 mm long. The petals are whitish, up to 2–3 mm long, and bloom in mid-May–early August. The berries are up to 13 mm wide, black, and stipitate glandular.

Habitat and range: Sticky currant usually grows in shady places in aspen-mixed conifer, Douglas fir, and spruce-fir forests through all but extreme southeastern Utah, at 1965–2950 m. It also occurs in much of the western United States and British Columbia.

Comments: The fruit of *Ribes viscosissimum* is almost dry, with numerous seeds. *Viscosissimum* means “very sticky.”

***Ribes wolfii* Rothr., Rothrock's currant**



Description: Rothrock's currant is a large shrub, growing up to 3 m high, with unarmed branches. The stems are usually stipitate glandular, with black sessile glands. The leaves are orbicular, with 3–5 lobes and a cordate base. The leaf margins are doubly crenate or dentate, and the leaf surfaces are glabrous to sparsely pubescent, sometimes with sessile minute glands. The flowers are up to 2 mm long, white, and bloom in May–August. The berries are up to 10 mm wide, with stipitate glands, and black when ripe.

Habitat and range: Rothrock's currant occurs in moist woods and meadows in mountainbrush, aspen-mixed conifer, Douglas fir, and spruce-fir communities throughout Utah, at 1645–3350 m. It often grows with *Ribes montigenum*, *R. inerme*, or *R. viscosissimum*.

Comments: *Ribes wolfii* can be confused with *R. hudsonianum* if fruits or flowers are not available. The glands of *R. wolfii* are more clear than yellow, and its fruits are somewhat dry and not very palatable. *Wolfii* is named after Carl Brandt Wolf, a 20th-century American botanist at the Rancho Santa Ana Botanical Gardens.



HYDRANGEACEAE—Hydrangea family

Members of the hydrangea family usually have opposite leaves and capsular fruits (rarely berries). The flowers are perfect and mostly regular. The ovary is usually inferior to partially inferior. Many species are cultivated as ornamentals (*Deutzia* and *Hydrangea*). In Utah, there are four genera represented by woody species.

***Fendlera* Engelm. & A. Gray**

Fendlera is named after August (Augustus) Fendler, a 19th-century German-born professional plant collector.

***Fendlera rupicola* Engelm. & A. Gray, Fendlerbush****Description:**

Fendlerbush is a small to medium-sized shrub, up to 2 m tall. The young stems are very branched, reddish or straw colored, and longitudinally grooved. The leaves

are opposite, or seem fascicled, 9–30 mm long, and are linear to narrowly ovate, with entire margins. The flowers are white and showy, with 8 stamens and 4 styles, appearing in late April–mid-June. The fruits are partially inferior capsules, 0.7–1.5 cm long.

Habitat and range: Fendlerbush grows in Colorado Plateau shrub, mountainbrush, and open pinyon-juniper communities in the Colorado Plateau region of southeastern and south-central Utah, at 1280–2410 m. It also occurs in Arizona, Colorado, Nevada, New Mexico, and Texas.

Comments: The wood of *Fendlera rupicola* is hard and was used by native peoples for arrow shafts and sturdy digging sticks. Fendlerbush is an attractive species, with landscape potential. It is also a desirable browse for deer, goats, sheep, and cattle. *Rupicola* refers to growing on cliffs or ledges.

***Fendlerella* (Greene) A. Heller**

Fendlerella is a diminutive of *Fendlera*, the genus in which this taxon was previously included.

Fendlerella utahensis (S. Watson) A. Heller, Utah fendlerella

Description: Utah fendlerella is a sprawling, much-branched subshrub, with twigs that are whitish and exfoliate in translucent flakes. It may grow to 1 m tall. The leaves are simple, opposite, and up to 12 mm long, linear-oblongate to narrowly ovate, the margins entire and somewhat revolute. The inflorescence is a compound cyme producing flowers with a turbinate hypanthium. The flowers are white, with 3 styles and usually 10 stamens, and appear in April–September. The fruits are small 3-valved capsules.

Habitat and range: *Fendlerella utahensis* is most common on sandstone and limestone outcrops in Colorado Plateau shrub, pinyon-juniper, and ponderosa pine communities. It is found in Garfield, Millard, San Juan, Uintah, Utah, Washington, and Wayne cos., at 1450–2800 m. It also occurs in Arizona, California, Colorado, Nevada, and New Mexico.

Comments: *Utahensis* means “of Utah.”

***Jamesia* Torr. & A. Gray**

Jamesia is named after Edwin P. James, a 19th-century American surgeon, naturalist, and explorer with the Long Expedition in the Rocky Mountains.

***Jamesia americana* Torr. & A. Gray, Cliff jamesia**

Description: Cliff jamesia is usually a sprawling shrub, up to 1 m tall. The twigs are reddish or whitish and have bark that is shed in white translucent strips. The leaves are often up to 4 cm long and 3 cm wide, elliptical to ovate, and distinctly petiolate, with serrate or dentate margins. The white flowers are showy, with 5 petals, 5 sepals, and 10 stamens, and bloom in May–September.



Habitat and range: Cliff jamesia occurs from mountainbrush to spruce-fir forest communities. It is found in Iron, Juab, Kane, Millard, Salt Lake, Utah, Wasatch, and Washington cos., at 1725–2750 m. It also grows in California, Colorado, Nevada, New Mexico, and Wyoming.

Comments: *Americana* refers to the United States. Two varieties are recognized in Utah. *Jamesia americana* var. *zionis* N. H. Holmgren & P. K. Holmgren occurs only in Zion National Park in southwestern Utah (Iron, Kane, and Washington cos.), hence the epithet *zionis*. This variety produces larger leaves than *Jamesia americana* var. *macrocalyx* (Small) Fedde, which is found in the Deep Creek and Wasatch ranges in Juab, Millard, Salt Lake, Utah, and Wasatch cos. This variety is a pioneer plant, often growing in plant crevices. It is drought tolerant and has some potential as an ornamental. The flowers are fragrant and attract bees and butterflies. *Macro* means “large,” referring to the size of the calyx.

***Jamesia tetrapetala* N. H. Holmgren & P. K. Holmgren, Basin jamesia**



Description: Basin jamesia may grow up to 1 m tall. The stems are pubescent at first, then exfoliating with age and exposing orangish-gray or brown bark. The leaves are petiolate and ovate to obovate, up to 2.5 cm long and 1.5 cm wide, with toothed margins. The flowers bloom in June–August and are usually solitary and showy, with 4 petals (occasionally 5) that are up to 15 mm long and white with pink tips, and 8 stamens. The fruit is a capsule, up to 7 mm long.

Habitat and range: Basin jamesia is a rare, narrowly distributed species that grows in limestone crevices in sagebrush-grass or mountainbrush communities, at about 2300 m, in western Millard Co. and neighboring Nevada.

Comments: *Jamesia tetrapetala* is endemic to the Great Basin. It is distinguished from *J. americana* by having flowers with 4 rather than 5 petals and, usually, a solitary inflorescence. *Tetrapetala* refers to the 4 petals.

***Philadelphus* L.**

Philos means “love” and *delphus* means “brother”; in Greek, *philadelphus* refers to a sweet-flowering shrub.

***Philadelphus microphyllus* A. Gray, Littleleaf mockorange**

Description: Littleleaf mockorange is a deciduous rounded shrub, growing up to 2 m tall. The leaves are opposite, and elliptical to ovate, with margins that are entire and slightly thickened. The fragrant flowers are white, up to 25 mm wide, usually with 4 petals and numerous stamens, and bloom in May–September. The fruit is a partially inferior capsule, up to 8 mm long.

Habitat and range: *Philadelphus microphyllus* occurs in pinyon-juniper woodlands, mountainbrush, ponderosa pine, and aspen-fir communities throughout Utah, at 1220–2650 m. It is also found in Arizona, California, Colorado, Nevada, New Mexico, Texas, Wyoming, and Mexico.

Comments: Littleleaf mockorange is drought tolerant and can be grown as an ornamental. *Microphyllus* means “small leaved.”



KRAMERIACEAE—Ratany family

The ratany family consists primarily of shrub and perennial species that have divaricate, grayish, pubescent branches. The flowers are perfect, irregular, and solitary. The fruit is an indehiscent pod, usually armed with prickles. Some members of this family (in the genus *Krameria*) are partial parasites, as their roots invade the roots of surrounding plants and absorb nutrients. Only one woody genus, *Krameria*, is represented in Utah.

Krameria Loeft.

Krameria is named after Johann Georg Heinrich Kramer, an 18th-century Austrian botanist.

Members of this genus produce oil, rather than nectar, to attract pollinators. The roots are a source of natural dye.

Krameria erecta Willd. ex Schult., Range ratany



Description: Range ratany is a medium-sized intricately branched shrub that grows up to 6 dm tall. The stems often terminate in thorns. The leaves are linear, up to 15 mm long and 1 mm wide, sometimes tomentose on both surfaces, and have spinose tips. The flower peduncles are up to 15 mm long, with 2 or 3 pairs of bracts that are often glandular. The sepals are purple and up to 9 mm long, with the outermost sepals hairy. The petals are up to 5 mm long, yellow, with deep purple tips, and with the upper petals united. The flowers are only partially opened at maturity and bloom in April–June. The fruits are up to 9 mm in diameter, subglobose, and covered with sharp-pointed red spines. The spines have retrorse barbs scattered along the distal half.

Habitat and range: Range ratany grows in sandy, rocky, and gravelly soils of Mojave Desert shrub communities in Washington Co., at 750–1070 m. It is also known from Arizona, California, Nevada, New Mexico, Texas, and Mexico.

Comments: The young fruits of *Krameria erecta* are a striking green, with red spines. The location of the barbs on the fruit spines and the connate base of the upper petals distinguishes this species from *K. grayi*. *Erecta* refers to the erect growth habit.

***Krameria grayi* Rose & Painter, White ratany**



Description: White ratany grows up to 6 dm tall, with stems that are intricately branched, often terminating in stout thorns. The twigs have gray spreading hairs when young. The leaves are up to 18 mm long and 3 mm wide, lance-ovate to elliptical, spinose tipped, and tomentose on both surfaces. The flower peduncles are up to 25 mm long, with a pair of densely white-hairy nonglandular bracts. The sepals are purple, up to 12 mm long, villous pilose dorsally, and pilose to glabrate ventrally. The petals are spatulate, up to 5 mm long, and yellowish, with deep-purple tips. The upper petals are distinct. The flowers are mostly open at maturity and bloom in April–May. The fruits are subglobose, up to 10 mm in diameter, and have spines. The spines are up to 6 mm long, with barbs only at the apex.

Habitat and range: *Krameria grayi* grows in Mojave Desert shrub communities in Washington Co., at 670–1170 m. Elsewhere, it is known from Arizona, California, Nevada, New Mexico, Texas, and Mexico.

Comments: *Grayi* refers to Asa Gray, a prominent 19th-century American botanist.



LAMIACEAE—Mint family

Plants in the mint family are known for their aromatic stems and leaves. They usually have square or 4-angled stems, with simple or compound, opposite leaves. The flowers are perfect and mostly irregular, with 5 united petals (usually 2 lipped). The fruit is a schizocarp, producing 4 nutlets. Some members of this family are well-known herbs, such as mint, sage, lavender, basil, parsley, oregano, and thyme. Some are ornamentals (*Coleus*, *Ajuga*, and *Leonotis*). Lavender and others are used for oils in perfumes. In Utah, this family is represented by four woody genera and four species.

Monardella Benth.

Monardella is named after Nicolás Monardes, a 16th-century Spanish botanist.

Monardella odoratissima Benth., Mountain monardella



Description: Mountain monardella is a strongly aromatic shrub that grows up to 4 dm tall on favorable sites. The leaves are up to 3 cm long, lanceolate, and tapered to a subsessile base. The inflorescences bear green puberulent bracts that are subequal in length to the calyx and broadly ovate or orbicular. The calyx is up to 8 mm long and 13 veined. The corollas are pale purple to rose-colored and about 15 mm long, with a tube that is longer than the calyx and very narrow lobes. The flowers bloom in April–August. The fruits are smooth nutlets.

Habitat and range: Mountain monardella grows in open, often rocky places in sagebrush-grass, pinyon-juniper, mountainbrush, ponderosa pine, aspen-mixed conifer, tall forb, and spruce-fir communities. It is found in almost all Utah counties, at 1810–3570 m. It also grows in California, New Mexico, Washington, and Wyoming.

Comments: *Monardella odoratissima* produces a strong odor that persists for years after its collection. *Odoratissima* means “very strong odor.”

***Poliomintha* A. Gray**

Polio means “gray” and *mintha* means “mint.”

***Poliomintha incana* (Torr.) A. Gray, Purple sage**

Description: Purple sage is an aromatic shrub that grows up to 1 m tall. The plants are very hairy and white, due to dense pubescence. The leaves are sessile, linear, up to 3 cm long, white tomentose, have entire margins, and appear veinless. The flowers are sympetalous, strongly 2 lipped, white, pink, or purple, and bloom in May–June. The calyx is tubular, shaggy pilose, and 13–15 veined. The calyx teeth are equal, or nearly so, and the throat is very narrow. There are 2 fertile stamens, ascending against the upper lip of the corolla. The 4 nutlets are smooth.

Habitat and range: Purple sage grows on stabilized dunes in Colorado Plateau shrub and pinyon-juniper communities in Emery, Garfield, Grand, Kane, San Juan, and Wayne cos., at 1175–1830 m. It also occurs in Arizona, California, New Mexico, and Texas.

Comments: *Poliomintha incana* has landscape potential. *Incana* means “hoary” or “gray.”

Salazaria Torr.

Salazaria is named after José Salazar, a surveyor with the U.S. and Mexican Joint Boundary Survey Commission in the mid-19th century.

Salazaria mexicana Torr., Bladder sage



Description: Bladder sage may grow up to 1 m tall, with branches that are divergent, spinescent, and covered with dense, short, appressed hairs. The leaves are opposite and up to 1.5 cm long, broadly

lanceolate to elliptic, with entire or (rarely) toothed margins. The flowers are up to 18 mm long, borne in spikes, and bloom in April–June. The petals are purple and distinctly 2 lipped, with the upper lip arching gracefully and enclosing a pair of 2-loculed stamens. The nutlets are tuberculate. The calyx persists, enclosing the fruits and forming greatly inflated bladders.

Habitat and range: Bladder sage grows in Mojave Desert shrub communities in Washington Co., at 940–1400 m. It also occurs in California, Nevada, New Mexico, Texas, and Mexico.

Comments: *Salazaria mexicana* is a very attractive plant of the Mojave Desert. The lower “lip” of the flower provides a landing platform

for the bees that pollinate it. *Mexicana* means “of Mexico.”

Salvia L.

Salvia is Latin for “sage.”

Salvia dorrii (Kellogg) Abrams, Dorr’s sage

Description: Dorr’s sage is a beautiful small, rounded, evergreen shrub, growing up to 8 dm tall. The leaves are grayish blue, opposite, up to 25 mm long and 15 mm wide, obovate to spatulate, with emarginate tips, and abruptly narrowed at the base to a long petiole. The inflorescence has up to 5 whorls of bracts subtending flowers that are purplish to greenish and bloom in May–June. The calyx is blue purple, up to 6 mm long, and 2 lipped, with the lower lip bearing 2 distinct lobes and the upper lip entire. The corolla is periwinkle blue and up to 12 mm long. The upper lip of the corolla is erect, and the lower lip is 3 lobed, with the middle lobe irregularly toothed. The stamens are long exserted. The fruit is a schizocarp, with 4 nutlets.



Habitat and range: Dorr's sage grows in Mojave Desert shrub and xeric sagebrush communities in Beaver, Iron, Juab, Kane, Millard, Tooele, and Washington cos., at 830–2350 m. It also occurs in Arizona, California, Idaho, and Nevada.

Comments: *Salvia dorrii* is a beautiful shrub of the western deserts and could be utilized more in native landscape gardens in well-drained soils. *Dorrii* honors Clarendon Herbert Dorr, a poet, inventor, and plant collector.



LOASACEAE—Stickleaf family

The stickleaf family includes plants that are annual, perennial, or shrubby in their growth habit and often have barbed or stinging hairs. The leaves are opposite or alternate, entire or lobed, and the flowers are regular. The ovary is usually inferior. The fruit is a capsule, with 1 to many seeds. In Utah, this family is best represented by the herbaceous genus *Mentzelia*. *Petalonyx* is our only native woody representative.

Petalonyx A. Gray

Petal refers to the flower petal and *onyx* means “with a claw, nail, or talon.”

Petalonyx parryi A. Gray, Parry’s sandpaper plant



Description:

Parry’s sandpaper plant is a medium-sized shrub, up to 1.5 m tall. The leaves are alternate and oblong-ovate, up to 4 cm long and 3 cm wide, with finely scabrous surfaces and

entire or crenate margins. The inflorescences are spicate or racemose, producing up to 65 attractive and aromatic flowers that bloom in May–early September. The bracts are chartaceous and lanceolate to lance-ovate, with acuminate tips and scabrous margins. The sepals are linear and up to 4 mm long. The petals are cream colored and up to 15 mm long, with narrowing linear claws. The stamens are up to 17 mm long and exerted. The capsules are up to 4 mm long.

Habitat and range: Parry’s sandpaper plant grows in Mojave Desert shrub communities in Washington Co., at 7780–1220 m. It grows on Chinle and Moenkopi substrates that often are high in gypsum content. It is also

known from Arizona, California, and Nevada.

Comments: *Petalonyx parryi* is rare in Utah. *Parryi* honors Charles Christopher Parry, a 19th-century British-born American botanist and student of John Torrey, Asa Gray, and George Engelmann. *Petalonyx parryi* is of conservation concern.



OLEACEAE—Olive family

Members of the olive family are mostly trees and shrubs. They usually have opposite leaves that may be simple or compound. The flowers have 4 petals and sepals with 2 distinct stamens and 1 pistil. The fruit is a berry, a drupe, a capsule, or a samara. Important economic uses for this family include fruit and oil from olive trees, perfume from jasmine, and lumber from ash. Forsythia, privet, and lilac are common ornamentals. Five woody species are native to Utah.

Forestiera Poir.

Forestiera honors André Robert Forestier, an 18th-century French physician and the botany teacher of Jean Louis Poiret, a French botanist and explorer who named this genus.

Forestiera pubescens Nutt., Desert olive



Description: Desert olive is a shrub, up to 2 m tall, with conspicuous lenticels. The leaves are green, opposite, simple, and oblanceolate to elliptical, up to 5.5 cm long and 2 cm wide, with the margins entire or serrulate. The staminate flowers are sessile; the pistillate flowers are pedicellate and bloom in April–May. The fruit is a blue-black drupe, up to 8 mm long.

Habitat and range: *Forestiera pubescens* grows on stream terraces in riparian communities along the Colorado and San Juan rivers and their tributaries, at 1130–1800 m. It also occurs in California east to Oklahoma and Texas, and southward to Mexico.

Comments: Foxes and coyotes eat the dark-colored fruits and leave purple-stained fecal pellets. Desert olive is often used as an ornamental. *Pubescens* means “with pubescence or down.”

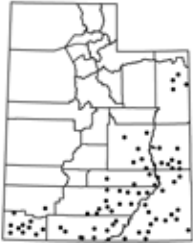
Fraxinus L.

Fraxinus is Latin for “ash.”

Fraxinus anomala Torr. ex S. Watson, Singleleaf ash

Description: Singleleaf ash is a many-stemmed shrub or small tree that grows up to 4 m tall. The stems are erect and 4 angled when young. The leaves are simple, or rarely trifoliate, and up to 7.5 cm long and 6 cm wide, ovate to suborbicular, and obtuse to retuse at the tip, with subentire to crenate or serrate margins. The flowers are usually perfect, with oblong anthers and a persistent, campanulate, 4-lobed, yellowish calyx,

lack petals, and bloom in April–early June. The samara is up to 27 mm long, oblanceolate to elliptic and emarginate at the tip. The fruit is winged almost to the base.



Habitat and range: Singleleaf ash grows in Colorado Plateau shrub, mountainbrush, pinyon-juniper, and ponderosa pine communities in Emery, Garfield, Grand, Iron, Kane, San Juan, Uintah, Washington, and Wayne cos., at 900–2625 m. It also occurs in California, Colorado, and New Mexico.

Comments: *Fraxinus anomala* is an anomaly, as the species name suggests, because it is the only ash with a simple leaf. It is tolerant of heat and drought and is a good landscape choice. The hard wood has been used for tools and utensils. *Fraxinus anomala* hybridizes with *F. velutina*. *Anomala* means “differing from the usual.”

***Fraxinus velutina* Torr., Velvet ash**

Description: Velvet ash is a deciduous tree, up to 12 m tall. The young branches are round and densely coated with spreading hairs, or occasionally nearly glabrous. The compound pinnate leaves have 3–5 leaflets that are villous below when young. The leaflets are elliptic to ovate, basally acute, and petiolate, with serrate margins. The flowers are imperfect and bloom in April–May. The calyx is campanulate and persistent. The petals are lacking. The fruit is a samara, up to 34 mm long and 6 mm wide.

Habitat and range: Velvet ash is a common plant of lower riparian corridors in Iron, Kane, San Juan, and Washington cos., at 800–1750 m. It is also known from Arizona and New Mexico.



Comments: *Fraxinus velutina* is used as an ornamental tree in cultivated landscapes. *Velutina* means velvet.

***Menodora* Bonpl.**

Menodora is Greek for “force” and “spear,” referring either to the strong spiny branches or to the force, or vigor, given to the cattle and sheep that ate the young shoots.

***Menodora scabra* A. Gray, Rough menodora**



Description: Rough menodora is a subshrub, growing up to 35 cm tall. The stems are woody only at the base. The leaves are alternate, up to 2.6 cm long and 5 mm wide, elliptical or oblong-lanceolate, glabrous, and rough to the touch. The calyx is minutely pubescent, with 8–11 linear lobes. The corolla is bright yellow and sub-rotate, with lobes up to 9 mm long, and blooms in April–August. The capsules are up to 12 mm thick and produce seeds that are up to 5 mm long.

Habitat and range: *Menodora scabra* grows in Colorado Plateau shrub, xeric sagebrush, and pinyon-juniper communities. It is reported from Beaver, Garfield, Kane, and Washington cos., at 1525–2000 m. It also occurs in Arizona, California, Colorado, New Mexico, Texas, and Mexico.

Comments: *Scabra* means “rough.”

Menodora spinescens A. Gray, Spiny menodora



Photo by Richard Shaw © Intermountain Herbarium, USU



Description: Spiny menodora is a much-branched spiny shrub that grows up to 8 dm tall. The leaves are linear or spatulate, up to 12 mm long and 4 mm wide, the margins entire, and the surfaces appressed pubescent. The calyx is linear, usually with 5 lobes. The corollas are funnelform, white tinged with brownish purple, and up to 15 mm long. The corolla lobes are up to 4.5 mm long and appear in April–June. The capsules are up to 9 mm thick, with seeds up to 6 mm long.

Habitat and range: *Menodora spinescens* grows in Mojave Desert shrub communities in southwestern Washington Co., at 670–825 m. Elsewhere, it is known from Arizona, California, and Nevada.

Comments: *Spinescens* means “somewhat spiny.”



PLANTAGINACEAE—Plantain family

The plantain family is a diverse family of mostly shrubs and herbs. It is widespread, but commonest in temperate regions of the world. The flowers are usually 4 or 5 merous and often 2 lipped, with a superior ovary. The fruit is usually a capsule. Insects and hummingbirds are the primary pollinators. There are some members of this family that have been cultivated, such as snapdragons (*Antirrhinum*), beardtongue (*Penstemon*), and speedwell (*Veronica*). *Digitalis* is used as a cardiac medication, but it is extremely poisonous, and even a small amount may be enough to cause death. *Penstemon* is the only woody genus of this family native to Utah. The penstemons were formerly included within the family Scrophulariaceae.

Penstemon Schmidel

Penstemon is Greek for “five stamens.” Penstemons have opposite leaves, 4 fertile stamens, and a hairy and infertile stamen (staminode). The fruit is a 2-valved capsule.

Penstemon ambiguus Torr., Bush penstemon



Description: Bush penstemon is our most woody penstemon, growing up to 6 dm tall, with freely branching slender stems. The leaves are filiform, up to 4 cm long and 1.7 mm wide, glabrous, entire, usually involute, and appearing terete. The flat-faced flowers occur at the top of the branches, are a beautiful pink to lavender, and may resemble phlox. They bloom in May–September. Neither the anthers nor the staminode extend beyond the corolla opening. The anthers are glabrous, blackish, and open for their full length.

Habitat and range: Bush penstemon grows in dunes and on sandy soils in Mojave Desert shrub, Colorado Plateau shrub, sagebrush-grass, mountainbrush, ponderosa pine, and juniper communities, at 760–1950 m, in Emery, Garfield, Kane, San Juan, and Washington cos. It also occurs in Arizona, Colorado, Kansas, Nevada, Oklahoma, Texas, and Mexico.

Comments: Utah plants belong to *Penstemon ambiguus* var. *laevis-simus* (D. D. Keck) N. H. Holmgren. Bush penstemon is an important soil stabilizer in sandy soils. It is beautiful in flower and makes an attractive plant in native landscapes. *Ambiguus* means “ambiguous” or “doubtful” and *laevis-simus* means “very smooth.”

***Penstemon deustus* Douglas ex Lindl., Hotrock penstemon**



Photo by Jim Harris

Description: Hotrock penstemon is a subshrub, growing up to 3 dm tall. The leaves are spatulate to oblanceolate at the bottom of the stem to nearly elliptic or lanceolate and sessile at the top, 1–2.5 cm long and 2.5–8 mm wide, with serrate to dentate margins. The corollas are white, with reddish-purple veins, and bloom in May–July. The anthers are ex-cluded, the staminode is included, and both are nearly glabrous.

Habitat and range: Hotrock penstemon occurs in rocky places in the pinyon-juniper zone in the northwestern corner of the state (Pilot Range), at 2000–2700 m. It is also found in California, Idaho, Oregon, Washing-ton, and Wyoming.

Comments: Our plants are identified as *Penstemon deustus* var. *pedi-cellatus* M. E. Jones. *Deustus* means “burned” and *pedicellatus* means “with a pedicel.”

***Penstemon linarioides* A. Gray, Flaxleaf penstemon**

Description: Flaxleaf penstemon is a suffrutescent plant, growing to nearly 4 dm tall, with branching stems covered with retrorsely spreading hairs. The leaves are up to 35 mm long, linear, entire, and puberulent. The inflorescence is 1–2 flowered at each node, with corollas that are lavender blue with reddish-purple veins, and blooms in May–August. The stami-node is short exserted and bearded, with dense yellow hairs. The anthers of the long stamen are glabrous and bluish black, opening their full length.



Photo by Jim Harris

Habitat and range: Flaxleaf penstemon grows in Beaver, Box Elder, Garfield, Iron, Kane, and Washington cos., in sagebrush-grass, pinyon-juniper, mountainbrush, and ponderosa pine communities, at 1500–3050 m. It also occurs in Arizona, Colorado, Nevada, and New Mexico.

Comments: Our plants belong to *Penstemon linarioides* var. *sileri* A. Gray. Flaxleaf penstemon makes a very nice ornamental choice in native landscapes. *Linarioides* means “flax-like” and *sileri* refers to Andrew Lafayette Siler, a 19th-century rancher and plant collector.

***Penstemon montanus* Greene, Cordroot penstemon**



Photo by Jim Harris

Description: Cordroot penstemon is suffrutescent and grows up to 3.5 dm tall, forming loose mats. The leaves are cauline, spatulate, and elliptic,

ovate, or lanceolate, up to 5 cm long, with serrate margins. The inflorescence is 1–2 flowered, with large blue, lavender, or violet corollas about 4 cm long, and blooms in June–August. The anther sacs are densely white woolly, and the staminode is rarely bearded.

Habitat and range: Cordroot penstemon grows in rocky outcrops or on talus slopes. It is found at 2285–3615 m, in Duchesne, Juab, Salt Lake, Sanpete, and Utah cos. It also occurs in Idaho, Montana, and Wyoming.

Comments: *Penstemon montanus* is a wonderful native landscape choice. *Montanus* means “of the mountains.”

***Penstemon petiolaris* Brandegees, Crevice penstemon**



Description: Crevice penstemon is suffrutescent, with clustered stems that usually grow up to 2 dm tall. The serrate leaves are thick, somewhat oval, abruptly petiolate, and usually blue glaucous. The corollas are a striking carmine pink and 13–17 mm long, with somewhat exerted staminodes tipped with short yellow hairs. The flowers bloom in May–June. The stamens are usually included, or nearly the length of the corolla opening, with glabrous peltate anthers.

Habitat and range: Crevice penstemon grows in the crevices of weathered rough outcrops of Pennsylvanian limestone in Washington Co., at 900–1375 m, in Mojave Desert shrub, mountainbrush, and pinyon-juniper communities. It also occurs in Arizona and Nevada.

Comments: *Penstemon petiolaris* has great horticultural potential and should be cultivated. It is very drought resistant and requires little soil. *Petiolaris* refers to the abrupt petiole.

Penstemon sepalulus A. Nelson, Littlecup penstemon

Description: Littlecup penstemon is a much-branched subshrub that grows up to 8 or 9 dm tall. The leaves are linear to elliptic, 1.5–9 cm long and 2–10 mm wide, cauline, glaucous, entire, and lack petioles. The flowers are violet, with white staminodes and bluish-purple anthers, and blooms in June–August. The corolla is 20–29 mm long, with spreading lobes. The calyx extends about 1/4 the length of the corolla. The stamens are usually included within the corolla. The anthers are horseshoe shaped and open only across the confluent apex of the sacs.

Habitat and range: Littlecup penstemon is endemic to Juab, Utah, and Wasatch cos., at 1500–2505 m. It is found in sagebrush-grass, mountainbrush, aspen-mixed conifer, and Douglas fir communities, often on slopes

and in disturbed road cuts.

Comments: The flowers of *Penstemon sepalulus* are pollinated by bees, and it is a lovely landscape plant. *Sepalulus* refers to having sepals.



POLEMONIACEAE—Phlox family

The phlox family consists mostly of herbaceous plants, with only a few shrubs, trees, and vines. Its members are native to the Northern Hemisphere and eastern South America. The plants often have an unpleasant odor. The inflorescence is usually cymose, with flowers that are regular and showy. Some species are adapted for pollination by bats, and others by bees, flies, moths, butterflies, or beetles. Many members of this family are used as ornamentals (gilia, phlox, Jacob's ladder). In Utah, there are eight species that are somewhat woody.

Ipomopsis Michx.

Ipo means "to impress" and *opsis* means "appearing," alluding to the showy flowers.

Ipomopsis congesta (Hook.) V. E. Grant, Ballhead gilia



Description: Ballhead gilia is a subshrub, woody at the base and growing up to 8 dm tall on favorable sites. The leaves are basal, cauline, alternate, entire, and covered with a dense, arachnoid, appressed tomentum. The cymose inflorescence consists of numerous flowers in a dense, terminal, bracteate head and blooms in June–August. The corolla is white or purplish. The fruit is a capsule, with seeds that are mucilaginous when wet.

Habitat and range: Ballhead gilia grows in xeric sagebrush, salt desert shrub, Colorado Plateau shrub, sagebrush-grass, pinyon-juniper, mountainbrush, and ponderosa pine communities in most Utah cos., at 1525–2290 m. Elsewhere, the species is known from Arizona, California, Colorado, Idaho, Nevada, New Mexico, and Oregon.

Comments: Several varieties of *Ipomopsis congesta* occupy a wide range of habitats in Utah. *Congesta* means “crowded.”

Ipomopsis roseata (Rydb.) V. E. Grant, Roseate gilia



Description: Roseate gilia is a small subshrub that grows up to 36 cm tall. The stems and leaves bear a sparse covering of crinkly multicellular hairs. The leaf surfaces may produce glands that are minutely stipitate. The leaves are primarily linear, cauline, with entire margins, and sometimes pinnatifid, with up to 4 pairs of lateral lobes. The flowers bloom in May–June and are pale yellow to white. The corolla tube extends beyond the calyx. The fruit is a capsule.

Habitat and range: Roseate gilia grows in Colorado Plateau shrub, pinyon-juniper, and sagebrush-grass communities. It is endemic to the Colorado Plateau, growing at 1190–2290 m, in Duchesne, Emery, Garfield, Grand, San Juan, Uintah, and Wayne cos. It also occurs in Colorado.

Comments: *Ipomopsis roseata* is commonly more woody than the very similar *I. congesta*. *Roseata* means “as a rose.”

***Leptosiphon* Benth.**

Leptosiphon means “a fine or slender tube.”

Leptosiphon nuttallii (A. Gray) J. M. Porter & L. A. Johnson, Flaxflower



Description: Flaxflower is a subshrub, up to 3 dm tall. The stems are woody at the base and rather sparingly branched above. The leaves are opposite, glabrous or puberulent, and divided into 5–9 linear to oblong, awl-shaped lobes, with minute spines at the tips. The flowers are subsessile, 5 merous, and bloom in June–August. The calyx is up to 9 mm long, with lobes that are lance-linear, sometimes awl-like, and 3 veined. The corollas are tubular, up to 10 mm long, and white.

Habitat and range: *Leptosiphon nuttallii* grows in sandy soils in big sagebrush-grass, pinyon-juniper, ponderosa pine, mountainbrush, bristle-cone pine, and spruce-fir communities throughout Utah, at 1370–3265 m. It is also found throughout the western United States and Mexico.

Comments: *Nuttallii* is named after Thomas Nuttall, a 19th-century English botanist and ornithologist who lived and worked in America for over 30 years.

***Linanthus* Benth.**

Linanthus means “flax flower.”

Linanthus caespitosus (Nutt.) J. M. Porter & L. A. Johnson, Mat prickly phlox

Description: Mat prickly phlox is a subshrub, with stems up to 10 cm long. The plants form dense pulvinate-caespitose cushions. The numerous stems are erect and relatively unbranched. The leaves are opposite, closely crowded, linear, up to 9 mm long, glabrous to glandular, and unevenly ciliate, often palmately cleft into 3–5 linear lobes that extend almost to

the leaf base and are minutely spinulose. The flowers are white, 4 merous, sympetalous, arise at the stem tips, and bloom in May–July. The corolla tube is up to 20 mm long, with 4 lobes diverging at right angles.



Habitat and range: Mat prickly phlox grows on alkaline soil, either barren clays or silts, a habitat often associated with hot springs. It occurs in Daggett, Emery, Garfield, Juab, Millard, and Sanpete cos., at 1675–2350 m. It is also known from Colorado, Nebraska, Nevada, and Wyoming.

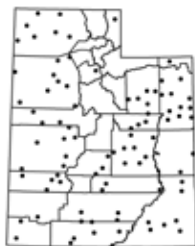
Comments: *Caespitosus* means “tufted” or “growing in dense tufts.”

***Linanthus pungens* (Torr.) J. M. Porter & L. A. Johnson, Granite prickly phlox**

Description: Granite prickly phlox grows up to 5 dm tall and is somewhat aromatic. The leaves are alternate, glabrous, puberulent or glandular puberulent, and spinulose. The lower leaves may be subopposite. The flowers are 5 merous and bloom in May–July. The calyx is up to 12 mm long, and the lobes are often unequal in size. The corolla tubes are up to 25 mm long, with divergent lobes that may be up to 15 mm long. The flowers are cream or pale yellow and often tinted purple on their outer surface. The stigmas are 3 parted. The capsules are up to 5.5 mm long and 3 loculed.

Habitat and range: Granite prickly phlox grows in xeric sagebrush, mountainbrush, pinyon-juniper, and ponderosa pine communities. It

occurs throughout Utah, at 1400–2745 m. It is also common throughout western North America.



Comments: *Linanthus pungens* is highly variable across its broad range. The flowers open at night and are pollinated by moths; during the day they may be partially closed, in a twisting pattern. *Pungens* means “piercing” or “sharp pointed,” referring to the leaves.

Linanthus watsonii (A. Gray) J. M. Porter & L. A. Johnson, Watson’s prickly phlox



Description: Watson’s prickly phlox is a low-growing subshrub that may be up to 1 dm tall. It forms sprawling or loosely matted clumps. The young stems are hirtellous or stipitate glandular. The leaves are mostly opposite, glabrous or glandular hairy, up to 15 mm long, and palmately cleft almost to their base, with 3–9 linear and spinulose segments. The flowers are commonly 6 merous and bloom in May–August. The calyx is up to 13 mm long, with distinctly unequal lobes. The tubular corolla is up to 28 mm long, with divergent lobes up to 13 mm long. The petals are white

or pale yellow. There are 6 stamens. The ovaries are usually 4 carpellate. The capsules are up to 4 mm long and bear many seeds.

Habitat and range: Watson's prickly phlox often grows in rock crevices on cliffs in Colorado Plateau shrub, sagebrush-grass, pinyon-juniper, mountainbrush, and spruce-fir communities. In Utah, *Linanthus watsonii* occurs in the mountains of the Wasatch Range and the Colorado Plateau, at 1220–3050 m. It is also known from Colorado, Idaho, and Wyoming.

Comments: *Watsonii* is named after Sereno Watson, a botanist for the Clarence King Expedition in California in the 19th century and curator of the Harvard Herbarium.

Phlox L.

Phlox is Greek for “flame.”

Phlox austromontana Coville, Desert phlox



Description: Desert phlox is a small subshrub, with caespitose, cushion- or mat-like stems arising from a branched caudex. The leaves are opposite, with pilose-puberulent to subglabrous surfaces, and up to 20 mm long. The flowers are subsessile or sessile, solitary, and produced at the stem tips. The calyx is campanulate and glabrous to villous. The corollas vary from white to blue, pink, lavender, or yellowish, and appear in April–May. There are two varieties in Utah, *Phlox austromontana* var. *austromontana* and *P. austromontana* var. *prostrata* E. E. Nelson (Silver Reef phlox), which has more open branching and a corolla that is usually white, with a somewhat villous calyx.

Habitat and range: *Phlox austromontana* var. *austromontana* is widespread and found in Beaver, Carbon, Duchesne, Emery, Garfield, Iron, Juab, Kane, Millard, Piute, Sanpete, Sevier, Tooele, Uintah, Utah,,

Wasatch, Washington, and Wayne cos., at 1525–3050 m. It also occurs in Arizona, California, and Nevada. *P. austromontana* var. *prostrata* has been collected in mountainbrush and pinyon-juniper communities and is endemic to Kane and Washington cos., at 1220–2135 m.

Comments: *Austromontana* means “of southern mountains” and *prostrata* means “prostrate” or “lying flat on the ground.”

Phlox jonesii Wherry, Zion phlox



Description: Zion phlox is a subshrub, forming loose mats, and is similar to *Phlox austromontana*. The leaves are opposite, simple, glabrous or nearly so, up to 35 mm long and 3 mm wide, and somewhat softer than those of *P. austromontana*. The flowers are usually sessile, solitary, and bloom in April–May, and the corolla is nearly white to bright pink purple.

Habitat and range: Zion phlox is endemic to Kane and Washington cos. It grows on canyon cliffs and ledges in pinyon-juniper, ponderosa pine, and mountainbrush communities, at 1435–2600 m.

Comments: *Phlox jonesii* forms intermediates with varieties of *P. austromontana*. *Jonesii* honors Marcus Eugene Jones, a mid-19th- to early 20th-century American botanist and early collector in the western United States.



POLYGALACEAE—Milkwort family

Members of the milkwort family are distributed nearly worldwide in temperate and tropical areas, but are absent in New Zealand, Polynesia, and the Arctic. The leaves are mostly simple, alternate, and entire. The flowers are usually brightly colored, irregular, and somewhat resemble the flowers of *Krameria* and those of the pea family. Pollination is mostly by insects. The fruit is usually a capsule, with seeds that are often hairy. Many members of this family produce saponins and calcium oxalate crystals in their tissues. Some species are used medicinally, and others for ornamentals. Only one genus, *Polygala*, has woody species in Utah.

***Polygala* L.**

Polygala means “much milk,” as it was once thought that cattle feeding on these plants would produce more milk.

***Polygala acanthoclada* A. Gray, Thorny milkwort**

Description: Thorny milkwort is a thorny shrub, up to 1.2 m tall, and intricately branched. The leaves are up to 25 cm long and 5 mm wide, narrowly oblanceolate, spatulate to elliptic, and usually densely hairy, but they may be subglabrate on some plants. The flowers are borne on few-flowered racemes and bloom in May–July. The pedicels are subtended by 1 or a pair of early-deciduous short bracts. The flowers are up to 5 mm long and yellowish green. There are usually 3 (sometimes 5) petals, with the upper 2 being whitish green with purple tips and the lower petal greenish and keeled. The capsules are superior, sessile, broadly elliptic, and 3–5 mm long.

Habitat and range: *Polygala acanthoclada* occurs most commonly on alkaline clay hills in xeric sagebrush and pinyon-juniper communities in western Utah, at 1150–2135 m, and in Arizona, California, and Nevada.

Comments: *Acantho* means “spiny” and *clada* means “branch” or “sprout.”

Polygala subspinososa S. Watson, Cushion milkwort



Description: Cushion milkwort is a rounded subshrub, up to 2 dm tall. The stems are spiny. The leaves are oblanceolate, spatulate, or elliptic, up to 3 cm long and 1 cm wide. Attractive flowers appear on racemose inflorescences in May–June. The petals are up to 14 mm long, with the 2 upper petals pink and the lower petal keeled and yellowish. The fruits are nearly round and up to 5 mm long.

Habitat and range: Cushion milkwort grows in salt desert shrub, xeric sagebrush, pinyon-juniper, mountainbrush, and ponderosa pine communities throughout Utah, at 1310–2290 m. It also grows in Arizona, California, Colorado, Nevada, and New Mexico.

Comments: *Polygala subspinososa* is an attractive species and should be considered for xeric landscapes. *Subspinososa* means “somewhat spiny.”



POLYGONACEAE—Buckwheat family

The buckwheat family includes herbs, shrubs, and vines. Its members are found world-wide, but they are most diverse and well represented in the deserts of the southwestern United States. The leaves are simple, usually alternate, and entire, with a membranous sheath at the base of the petiole. The inflorescence is usually cymose, with flowers that are small and inconspicuous, pollinated primarily by bees, flies, and wind. The fruits are achenes. Sour-tasting oxalic acid is often present in the tissue. Some species are used as ornamentals (coral vine), and others as food (buckwheat, rhubarb, dock, and sorrel). This family is well represented in Utah by both herbaceous and woody species. All 17 woody species native to Utah are in the genus *Eriogonum*.

***Eriogonum* Michx.**

Erio means “woolly” and *gonum* means “joints.” Dichotomous branching of the stems of the inflorescence is common in many members of this genus.

***Eriogonum ammophilum* Reveal, Ibex buckwheat**

Description: Ibex buckwheat is a spreading subshrub, 1–8 dm tall. The leaves are basal or cauline, up to 1/4 the length of the flowering stem, and tomentose to floccose, with broad elliptic blades 1–2 cm long and 0.8–1.7 cm wide. The inflorescence is cymose and open, with glabrous branches and white flowers, 2–3 mm long, that bloom in June–September.

Habitat and range: *Eriogonum ammophilum* is narrowly endemic, rare, and prefers sandy soils. It occurs only in Millard Co., in mixed grasslands, sagebrush, and pinyon-juniper communities, at 1600–1900 m.

Comments: *Ammophilum* means “sand loving.” Ibex buckwheat is of conservation concern.

Eriogonum bicolor M. E. Jones, Pretty buckwheat



Photo by Susan Meyer

Description: Pretty buckwheat is a mound-forming endemic shrub that grows to only 8 cm tall, with reddish stems. The leaves are cauline, 1 per node, crowded, so as to nearly obscure the internodes, up to 2 cm long and 3 mm wide, and tomentose to floccose, with revolute margins. The inflorescence is umbellate to cymose and compact. The flowers are white to rose, often with pink to red-purple midveins, and bloom in May–July.

Habitat and range: *Eriogonum bicolor* is a beautiful small shrub that grows in salt desert shrub and pinyon-juniper communities in Carbon, Emery, Garfield, Grand, San Juan, Sevier, and Wayne cos., at 1340–2000 m.

Comments: *Bicolor* means “two colored.”

Eriogonum clavellatum Small, Comb Wash buckwheat

Description: Comb Wash buckwheat is a spreading subshrub, with greenish to grayish stems. The leaves occur 1 per node, or in fascicles, and are cauline, oblanceolate, 3–15 mm long and up to 2 mm wide, floccose, and white tomentose, densely so below, with tightly revolute margins. The inflorescence is cymose to umbellate and glabrous, with white or pink dimorphic tepals. The flowers bloom in May–July.

Habitat and range: Comb Wash buckwheat occurs on the Cutler Formation in Colorado Plateau shrub communities in San Juan Co., at 1325–1800 m. It also grows in Colorado and New Mexico.



Comments: *Eriogonum clavellatum* is endemic to the Colorado Plateau. *Clavellatum* means “slightly club shaped.” *Eriogonum clavellatum* is of conservation concern.

***Eriogonum contortum* Small ex Rydb., Grand buckwheat**

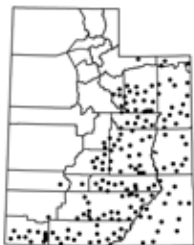


Description: Grand buckwheat is a clump-forming endemic, growing up to 2 dm tall. The leaves are linear to narrowly oblanceolate, up to 20 mm long and 2 mm wide, revolute, and white tomentose on 1 or both sides. The stems of the inflorescence are tomentose. The involucre is glabrous, with yellow flowers that bloom in May–August.

Habitat and range: Grand buckwheat is soil specific to Mancos shale and occurs only in Grand Co., in salt desert shrub communities, at 1280–1525 m.

Comments: *Eriogonum contortum* is a rare species, closely related to *E. brevicaulis*. *Contortum* means “contorted” or “twisted.” Grand buckwheat is of conservation concern.

***Eriogonum corymbosum* Benth.**



This group of buckwheats has a high degree of variability within the species. It consists of varieties that are spreading, rounded, or erect shrubs and subshrubs. Their leaves are cauline, not fascicled. The flowers vary from white, to cream, to pink, to yellow, to pale yellow. We have described seven varieties below. Two varieties are generally yellow flowered, and five varieties are white to cream or pink flowered. Most experts agree that the varieties of *E. corymbosum* are highly variable, may involve hybridization, and are difficult to distinguish (see the *Flora of North America*, vol. 5, for an identification key to the varieties of *E. corymbosum*).

(see the *Flora of North America*, vol. 5, for an identification key to the varieties of *E. corymbosum*).

***Eriogonum corymbosum* var. *aurum* (M. E. Jones) Reveal, Golden buckwheat**

Description: The leaves of this variety are cauline, occurring on 1/2 or more the length of the flowering stem, elliptic, up to 4 cm long, glabrous dorsally, and densely tomentose below. The flowers are glabrous, yellow to nearly white, and bloom in August–October.

Habitat and range: Golden buckwheat is extremely rare, found only in Washington Co. It occurs on gravelly slopes in Mojave Desert shrublands and juniper woodlands, at 1000–1100 m.

Comments: *Aureum* means “golden.”

***Eriogonum corymbosum* var. *corymbosum*, Crispleaf buckwheat**

Description: This variety is a shrub or subshrub, up to 3 dm tall, and more common than the other varieties. The cauline leaves, occurring on 1/2 or more the length of the flowering stem, are lanceolate, elliptic to oblanceolate, up to 4.5 cm long, and usually densely tomentose below (sometimes less so above). The branches of the inflorescence are tomentose to floccose. The flowers are white to cream, glabrous, and bloom in July–October.

Habitat and range: Crispleaf buckwheat is found salt desert shrub, Colorado Plateau shrub, sagebrush, pinyon-juniper, and coniferous communities in Carbon, Daggett, Duchesne, Emery, Garfield, Grand, Kane, San Juan, Sevier, Uintah, Wasatch, and Wayne cos., at 1200–2700 m. It also occurs in Arizona, Colorado, and Wyoming.

Comments: *Corymbosum* refers to the corymb-type inflorescence.

***Eriogonum corymbosum* var. *glutinosum* (M. E. Jones) M. E. Jones, Sticky buckwheat**

Description: Sticky buckwheat is the common yellow-flowered variety of the species, growing up to 1 m tall. The cauline leaves, occurring on 1/2 or more the length of the flowering stem, are lanceolate, elliptic to oblanceolate, up to 4.5 cm long, usually densely tomentose below, and

sometimes less so above. The branches of the inflorescence are tomentose to floccose. The flowers are glabrous, yellow, pale yellow, or occasionally white and bloom in July–October.

Habitat and range: This variety grows on sandy or fine-textured soils on slopes, rocky outcrops, or washes in Beaver, Emery, Garfield, Iron, Kane, Washington, and Wayne cos., at 800–2600 m. It also occurs in Arizona.

Comments: Since this variety is yellow flowered, the best way to distinguish it from *E. corymbosum* var. *aureum* is by geography, as well as by the tomentose or floccose inflorescence. *Glutinosum* means “glutinous” or “sticky.”

***Eriogonum corymbosum* var. *heilii* Reveal, Heil's buckwheat**

Description: The branches and inflorescence of this variety are tomentose to floccose. The cauline leaves, occurring on up to 1/4 the length of the flowering stem, are up to 2 cm long and 0.8 cm wide, densely tomentose below, and less so and greenish above. The flowers are white to pink, glabrous, and blooms in July–August.

Habitat and range: Heil's buckwheat grows only in Capitol Reef National Park, at 2500–2800 m. It occurs with bristlecone pine, and is found on the eastern slope of Thousand Lake Mountain.

Comments: *Heilii* honors present-day New Mexico botanist and cactus specialist Kenneth D. Heil.

***Eriogonum corymbosum* var. *orbiculatum* (S. Stokes) Reveal & Brotherson, Roundleaf buckwheat**

Description: This variety has leaf blades that are broadly ovate to nearly orbiculate, up to 3.5 cm long, and is floccose to tomentose on both sides. The inflorescence is dense and somewhat flat topped. The branches of the inflorescence are densely tomentose. The flowers are white, glabrous, bloom in August–October, and are spectacular.

Habitat and range: Roundleaf buckwheat occupies sandy to gravelly flats, washes, and slopes in Colorado Plateau shrub, hanging garden, and pinyon-juniper communities in Emery, Garfield, Grand, Kane, San Juan, and Wayne cos., at 900–2300 m. It also occurs in Arizona and Colorado.

Comments: Roundleaf buckwheat has wonderful landscape qualities. *Orbiculatum* means “orbicular,” referring to the leaves.

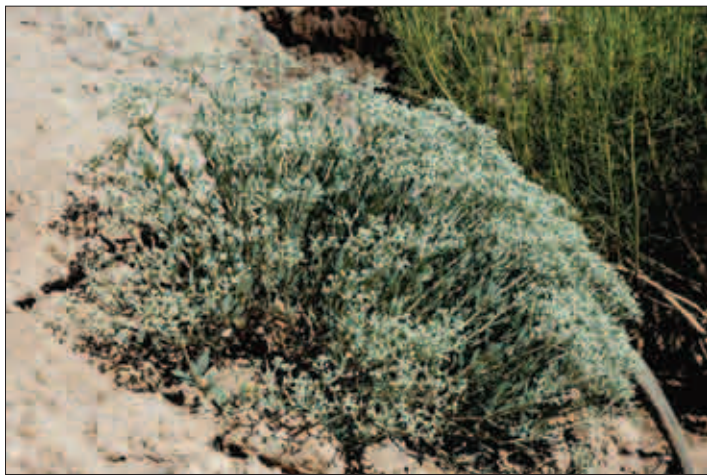
***Eriogonum corymbosum* var. *revealianum* (S. L. Welsh) Reveal, Reveal's buckwheat**

Description: The leaves of this variety are cauline, occurring on only 1/4 or less the length of the flowering stems, lanceolate to oblanceolate, up to 4.5 cm long, and densely tomentose, although less so on the upper surface. The branches of the inflorescence are floccose. The flowers are glabrous, white to cream, and bloom in July–September.

Habitat and range: Reveal's buckwheat grows on gravelly to rocky clay slopes in sagebrush, pinyon-juniper, and conifer woodlands, at 2100–2800 m. It occurs in Garfield, Kane, Piute, San Juan, Sanpete, and Uintah cos.

Comments: Reveal's buckwheat is difficult to distinguish from *Eriogonum corymbosum* var. *corymbosum*. It also resembles *E. lonchophyllum*, which has glabrous inflorescences. *Revealianum* honors present-day American botanist James Lauritz Reveal.

***Eriogonum corymbosum* var. *velutinum* Reveal, Velvety buckwheat**



Description: The leaves of this variety are cauline, occurring on up to 1/2 the length of the flowering stem, elliptic to oblong or ovate, up to 3.5 cm long, densely white-tomentose below, and white to tan lanate above. The flowers are glabrous, white to cream and occur on rather open branches that are densely tomentose. It blooms in August–October.

Habitat and range: Velvety buckwheat occurs in southeastern Utah, in Garfield, Grand, Kane, San Juan, and Wayne cos. It grows in salt desert shrub, Colorado Plateau shrub, sagebrush-grass, and pinyon-juniper communities, at 1200–2300 m. It also is found in Arizona, Colorado, New Mexico, and Texas.

Comments: Velvety buckwheat is difficult to distinguish from *Eriogonum corymbosum* var. *orbiculatum*. *Velutinum* means “velvety.”

***Eriogonum fasciculatum* Benth., Mojave buckwheat**

Description: This large shrubby buckwheat grows up to 8 dm tall. It is among the easiest to identify in the state, because of its leaves, which are often fascicled and narrowly oblong to oblanceolate, up to 18 mm long and 5 mm wide, with revolute margins. The inflorescence is capitate to cymose-umbellate, with white to pink flowers that are usually pubescent. In Utah, it flowers throughout the year.

Habitat and range: Mojave buckwheat grows in Mojave Desert shrub and pinyon-juniper communities in Washington Co., at 730–1495 m. It also occurs in Arizona, California, and Mexico.



Comments: Our variety, *Eriogonum fasciculatum* var. *polifolium* (Benth.) Torr. & A. Gray, is often the dominant shrub of the Mojave and Sonoran deserts and is occasionally planted as an ornamental. Mojave buckwheat is an important food plant for many butterflies, and it is also the most important native source of honey in California. *Fasciculatum* means “fascicled” and *polifolium* means “white leaved.”

***Eriogonum heermannii* Durand & Hilg., Heermann’s buckwheat**



Heermann’s buckwheat is a low-growing rounded shrub that may grow up to 6 dm tall. The stems may be grooved or angled to some degree. The leaves are mainly 3–17 mm long and 2–5 mm wide, tomentose on 1 or both sides. The flowers are glabrous and white to yellowish white. Two distinct varieties occur in Utah.

***E. heermannii* var. *subspinosum* Reveal, Tabeau Peak buckwheat**

Description: This variety is more open than var. *sulcatum*, and is not cushion-like. The stems of the cymose inflorescence are more spreading, and only slightly grooved or terete. The involucre are more than 2 mm long. Flowering occurs in March–May.

Habitat and range: Tabeau Peak buckwheat grows in Washington Co., at 1035–1500 m, in limestone gravels and outcrops in Mojave Desert shrub communities. It occurs only in the southern sections of the Beaver Dam Mountains, and in the eastern end of the Virgin Mountains in Arizona.

Comments: *Heermannii* honors Dr. Adolphus L. Heermann, a 19th-century naturalist and collector. *Subspinosum* means “somewhat spiny.”

E. heermannii var. *sulcatum* (S. Watson) Munz & Reveal, Limestone buckwheat



Description: This variety is more compact and cushion-like than var. *subspinosum*. The stems of the inflorescence are divaricately branched, sharply angled, and strongly grooved. The involucres are 0.7–1.5 mm long. Flowering is in April–October.

Habitat and range: This buckwheat species grows mainly on limestone and, less often, on sandstone in Mojave Desert shrub, mountain-brush, and pinyon-juniper communities, at 1220–2135 m, in Washington Co. It also occurs in Arizona, California, and Nevada.

Comments: *Sulcatum* means “furrowed” or “grooved.”

Eriogonum hylophilum Reveal & Brotherson, Gate Canyon buckwheat



Photo by Sherel Goodrich

Description: Gate Canyon buckwheat is a subshrub, up to 4 dm tall and 5 dm wide. The cauline leaves, sheathing on the lower 1/3 of the stem, are

linear to lanceolate, 3.5–8 cm long, and densely white tomentose below. The leaf margins are slightly revolute. The inflorescence is cymose, open, and tomentose, with white glabrous flowers that bloom in July–September.

Habitat and range: Gate Canyon buckwheat is endemic to Duchesne Co., growing in gravelly slopes in sagebrush, pinyon-juniper, and conifer communities, at 2040–2600 m.

Comments: It has been suggested that *Eriogonum hylophilum* is of hybrid origin, between *E. corymbosum* and *E. brevicaule* var. *laxifolium*. *Hylophilum* means “woods” or “forest loving.” Gate Canyon buckwheat is of conservation concern.

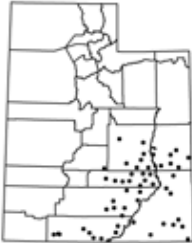
***Eriogonum lancifolium* Reveal & Brotherson, Lanceleaf buckwheat**

Description: Lanceleaf buckwheat is a spreading shrub, growing up to 8 dm tall and 10 dm wide, and appears quite grayish and tomentose. The leaves are usually more than 2 times longer than wide, lanceolate to elliptic, and usually densely silvery tomentose on both surfaces. The inflorescence is cymose, often compact, with flowers that are glabrous, white to cream, and bloom in July–October.

Habitat and range: *Eriogonum lancifolium* grown on Mancos shale hills and flats, at 1500–1800 m, and is endemic to Carbon and Emery cos.

Comments: *Lancifolium* means “lance leaf.”

***Eriogonum leptoclados* Torr. & A. Gray**



Sand buckwheat is clump forming and grows up to 2–12 dm tall, with racemose inflorescences. The leaves are flat to revolute and tomentose on 1 or both sides. Three varieties are recognized in Utah.

***Eriogonum leptoclados* var. *leptoclados*, Sand buckwheat**

Description: Sand buckwheat differs from the other 2 varieties in its narrower leaves, 4 cm long and 4 mm wide. The flowering stems are floccose to glabrate, and the yellow flowers bloom in June–October.



Habitat and range: This variety is more common than the other 2 varieties, and is found in Emery, Garfield, Grand, San Juan, Sevier, and Wayne cos., at 1100–1900 m. This endemic buckwheat grows on white or red blow-in sand, in Colorado Plateau shrub and pinyon-juniper communities. It may also occur in Arizona.

Comments: *Leptocladon* means “thin stemmed.”

***Eriogonum leptocladon* var. *papiliunculi* Reveal, Butterfly buckwheat**

Description: Butterfly buckwheat leaves are lanceolate to narrowly elliptic, up to 4 cm long and 1.5 cm wide. The margins are flat. The inflorescence branches are yellowish green and glabrous or, rarely, tomentose. The flowers are white and bloom in June–October.

Habitat and range: variety prefers windblown white or red sands in sagebrush-grass and pinyon-juniper communities in Garfield, Kane, San Juan, and Wayne cos., at 1200–2200 m. It also occurs in Arizona and New Mexico.

Comments: *Papiliunculi* means “used by butterflies.”

***Eriogonum leptocladon* var. *ramosissimum* (Eastw.) Reveal, San Juan buckwheat**

Description: San Juan buckwheat leaves are linear-lanceolate to narrowly oblong, up to 3.5 cm long and 1 cm wide. The margins are plain or sometimes revolute. The inflorescence stems are white tomentose, only occasionally floccose, and gray to gray green. The flowers are white and bloom in June–October.

Habitat and range: This variety grows in sandy soils of Colorado Plateau shrub and juniper communities, at 1310–1770 m, in Garfield, Kane, San Juan, and Wayne cos. It also occurs in Arizona, Colorado, and New Mexico.

Comments: *Ramosissimum* means “much branched.”

***Eriogonum leptophyllum* (Torr.) Wooton & Standl., Slenderleaf buckwheat**

Description: Slenderleaf buckwheat grows as a shrub or subshrub, up to 9 dm tall. The branches are green to yellowish green. The slender leaves, occurring on branches with very short internodes, are linear, up to 3 mm wide,

tomentose below, and tightly revolute. The inflorescence is cymose and rather compact, with white to pink flowers that bloom in July–November.



Habitat and range: *Eriogonum leptophyllum* occurs on clay flats and slopes in Colorado Plateau shrub, grassland, and pinyon-juniper communities in San Juan Co., at about 1700 m, and in neighboring Arizona, Colorado, and New Mexico.

Comments: *Leptophyllum* means “thin leaf.”

Eriogonum lonchophyllum Torr. & A. Gray, Longleaf buckwheat



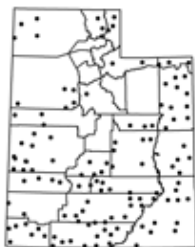
Description: Longleaf buckwheat may be shrubby, subshrubby, or herbaceous. The leaves are up to 11 cm long and 12 mm wide, linear to elliptic, lanceolate, or oblanceolate, and tomentose on 1 or both sides. The flowers are typically white or cream, sometimes suffused with pink,

glabrous, with exerted stamens, and grow in cymose inflorescences, blooming in June–October. Two varieties recognized in Utah.

Habitat and range: *Eriogonum lonchophyllum* var. *lonchophyllum* occurs in Emery, Grand, San Juan, and Uintah cos., at 2110–2745 m, on calcareous soils and the Green River Formation. *Eriogonum lonchophyllum* var. *saurinum* (Reveal) S. L. Welsh is rare and limited to northern Uintah Co., at 1585–1895 m, on Mowry shale.

Comments: *Eriogonum lonchophyllum* var. *lonchophyllum* is mostly acaulescent, with short internodes, and is more common than var. *saurinum*. *E. lonchophyllum* var. *saurinum* is caulescent, with internodes that are longer and more obvious than those of var. *lonchophyllum*. *Lonchophyllum* means “spear-like leaves” and *saurinum* is Greek for “lizard.”

***Eriogonum microthecum* Nutt.**



This species of buckwheat grows as a shrub or subshrub, with spreading to erect stems that may be lanose to glabrate. The leaves are caulescent, 1 per node or fasciculate. The leaf blade is usually elliptic to linear or obovate, tomentose, at least below, with occasionally revolute margins. The inflorescence is cymose, compact, and sometimes flat topped. The flowers are glabrous and yellow, white to pink, orange, rose, red, or, occasionally, cream. Yellow-flowered forms do not occur in Utah. This species is an important food plant for browsing deer populations. Several varieties have been identified, but they are transitional and may be very difficult to distinguish.

Several varieties have been identified, but they are transitional and may be very difficult to distinguish.

***Eriogonum microthecum* var. *lapidicola* Reveal, Pahute Mesa buckwheat**

Description: Pahute Mesa buckwheat is a subshrub, up to 1.5 dm tall and 3.5 dm wide, with a somewhat brownish or reddish tomentum. The leaf blades are elliptic to ovate and up to 4 mm long. The margins are not revolute. The flowers are white to red, pink, rose, or orange, and bloom in July–September.

Habitat and range: This variety occupies sandstone outcrops in sagebrush and pinyon-juniper communities in Juab and Washington cos., at 2600–3100 m. It also occurs in California and Nevada.

Comments: *Eriogonum microthecum* var. *lapidicola* is very similar to var. *simpsonii*. *Micro* means “small” and *thecum* means “box, case, or container.” *Lapid* means “stony” and *cola* means “to inhabit.”

***Eriogonum microthecum* var. *laxiflorum* Hook., Basin buckwheat**

Description: Basin buckwheat is a subshrub, 1–5 dm tall, with a whitish tomentum, rather than the brownish or reddish tomentum of var. *lapidicola*. The leaves are usually elliptic, up to 6 mm long, and densely to sparsely whitish tomentose above. The margins are not revolute. The perianth is white to pink or rose and blooms in June–October.

Habitat and range: This variety grows in sandy to gravelly flats and slopes in northern and western Utah, at 1500–3200 m. It also occurs

Arizona, California, Colorado, Idaho, Montana, Nevada, Oregon, Washington, and Wyoming.

Comments: Basin buckwheat is the main host plant for the Mattoni blue butterfly. *Laxiflorum* means “loose flowered.”

***Eriogonum microthecum* var. *phoeniceum* (L. M. Shultz) Reveal, Scarlet buckwheat**

Description: Scarlet buckwheat is a subshrub, with a reddish tomentum. It grows up to 4 cm tall and is often spreading. The leaves are linear and densely white tomentose, with revolute margins. The flowers are white to pink, rose, or red, and flowering occurs in July–September.

Habitat and range: This variety grows on tuffaceous ash outcrops, at 1600–2100 m, in only a few populations in Juab and Millard cos.

Comments: *Eriogonum microthecum* var. *phoeniceum* is transitional with var. *simpsonii*. *Phoeniceum* means “purple red” for its stems; also in reference to its habitat, rising from the ashes”

***Eriogonum microthecum* var. *simpsonii* (Benth.) Reveal, Simpson’s buckwheat**

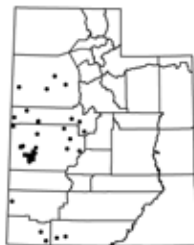
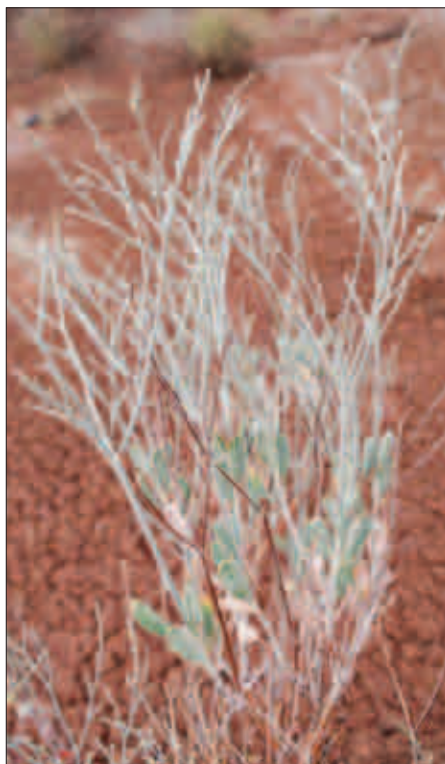


Description: Simpson’s buckwheat is up to 15 dm tall and is more woody than the other varieties of *E. microthecum*. It has a whitish tomentum and narrowly elliptic leaves, with revolute margins. The flowers are white to pink or rose and bloom in June–October.

Habitat and range: This variety occurs on clayey to gravelly washes, flats, and slopes in salt desert shrub, xeric sagebrush, pinyon-juniper, ponderosa pine, mountainbrush, and mixed conifer communities. It is found in Cache, Carbon, Emery, Garfield, Grand, Iron, Kane, Millard, San Juan, Sevier, Uintah, Utah, Washington, and Wayne cos., at 1400–2300 m. It also grows in Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, and Wyoming.

Comments: *Simpsonii* honors Captain James H. Simpson, who headed the 19th-century Utah Expedition survey.

***Eriogonum nummulare* M. E. Jones, Coin buckwheat**



Description: Coin buckwheat is a spreading shrub, up to 10 dm tall, with grayish stems. The leaves are broadly oblanceolate to elliptic, up to 30 mm long, and densely white tomentose. The tomentose inflorescence is an open racemose cyme.

The flowers are white, often suffused with pink, glabrous, and bloom in July–October.

Habitat and range: Coin buckwheat grows in sandy or sometimes gravelly washes, flats, and slopes in salt desert shrub, xeric sagebrush, and pinyon-juniper communities. It occurs in Iron, Juab, Kane, Millard, Tooele, and Washington cos., at 800–2600 m. This species also is found in Arizona, California, and Nevada.

Comments: *Eriogonum nummulare* is the food plant for the pallid dotted blue and the Sand Mountain blue butterflies. Coin buckwheat is becoming scarce in some of its range, due to offroad vehicle activity. *Nummulare* means “resembling a coin.”

***Eriogonum smithii* Reveal, Smith’s buckwheat**

Description: This beautiful shrubby buckwheat grows up to 1 m tall and 2 m wide. The plant is glabrous and bright green. The leaves are narrowly elliptic, glabrous, green on both surfaces, and occasionally have slightly revolute margins. The flowers are bright yellow and bloom in July–October.

Habitat and range: Smith’s buckwheat occurs only in the San Rafael Desert in Emery and Wayne cos., at 1400–1900 m. It is restricted to Entrada Formation sands, which are often rich in selenium.



Comments: *Smithii* is named after Dr. Arthur D. Smith, a professor at Utah State University in the 20th century and a member of the Utah State Fish and Game Department. *Eriogonum smithii* is of conservation concern.

***Eriogonum umbellatum* Torr., Sulfur flower**

This widespread, complex species is most commonly herbaceous; however, there are two varieties occurring in Utah that approach the shrub habit, and we include them here.

***Eriogonum umbellatum* var. *juniporinum* Reveal, Juniper sulfur flower**

Description: Juniper sulfur flower is the cream, whitish, or pale yellow to greenish-yellow flowering form of the species. The leaves form loose rosettes, with elliptic blades up to 2 cm long. The inflorescence is a compound umbel, which branches 2–5 times and flowers June–October.

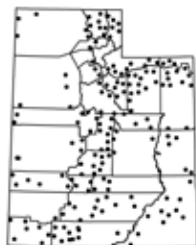
Habitat and range: This variety grows in salt desert shrub, xeric sagebrush, pinyon-juniper, and mixed conifer communities, at 1300–2300 m, in San Juan and Washington cos. It also occurs in Arizona, California, and Nevada.

Comments: *Umbellatum* refers to the shape of the inflorescence and *juniporinum* refers to the juniper plant community.

***Eriogonum umbellatum* var. *subaridum* S. Stokes, Arid buckwheat**

Description: Arid buckwheat is a subshrub or shrub, growing up to 9 dm tall, and has leaves that occur in rather loose rosettes. The leaf blades are elliptic, to 2 cm long, and thinly floccose on both surfaces, or glabrous and green above. The inflorescence is a compound umbel and branches 2–5 times, as does that of var. *juniporinum*. It differs from var. *juniporinum* in its bright yellow flowers that bloom in June–October.

Habitat and range: This variety occupies sandy to gravelly flats and slopes in salt desert shrub, xeric sagebrush, pinyon-juniper, mountainbrush, and mixed conifer communities in all Utah counties except Morgan, at 1370–2745 m. It also occurs in Arizona, California, Colorado, and Nevada.



Comments: *Subaridum* means “growing in somewhat dry places.”

Eriogonum wrightii Torr. ex Benth., Wright’s buckwheat



Description: Wright’s buckwheat is a shrub, up to 5dm tall, with tomentose stems. The leaves are more or less fascicled, oblanceolate to elliptic, up to 25 mm long, and tomentose on both sides. The flowers are white to pink or rose in cymose inflorescences and flowering occurs in July–October.

Habitat and range: Wright’s buckwheat grows on volcanic ash or sandstone in pinyon-juniper, mountainbrush, sagebrush, and ponderosa pine communities, at 1190–1750 m, in Washington Co. It also occurs in neighboring Arizona, California, Nevada, New Mexico, and Texas.

Comments: Our plants belong to *Eriogonum wrightii* var. *wrightii*. *Wrightii* honors Charles (Carlos) Wright, a 19th-century American botanist and plant collector.



RANUNCULACEAE—Buttercup family

Members of the buttercup family are found worldwide, but they are most common in temperate and cold areas of the Northern Hemisphere. Most species in the family are herbaceous, but a few woody vines (*Clematis*) are included. The leaves are usually compound. The flowers are mostly regular, often showy, and adapted for a variety of pollinators. The calyx, rather than the corolla, often provides flower color. Some members of this family are poisonous, due to various alkaloids, glycosides, and saponins, including monkshood (*Aconitum*), baneberry (*Actaea*), larkspur (*Delphinium*), golden-seal (*Hydrastis*), buttercup (*Ranunculus*), and hellebore (*Helleborus*). Others are used as herbal medicines, and many are common ornamentals (windflower, columbine, virgin's-bower, larkspur, etc.). Some may resemble members of the family Rosaceae, but the flowers of Ranunculaceae lack a hypanthium, and most members of this family lack stipules, which are almost always present in Rosaceae.

Clematis L.

Clematis means “climbing plant.”

Clematis columbiana (Nutt.) Torr. & A. Gray, Rocky Mountain clematis

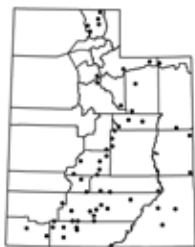


Photo by Jim Harris

Description: Rocky Mountain clematis is a sprawling vine, with woody perennial stems. The leaves are opposite, deciduous, petiolate, and bi- or triternate, with the terminal leaflet replaced by a twining tendril up to 19 mm long. The flowers are solitary and bell shaped, with 4 sepals (no petals) that are violet or blue, nodding, and up to 6 cm long. Blooming is in late spring–early summer. The styles are up to 5.5 cm long, plumose, and persistent on mature achenes.

Habitat and range: *Clematis columbiana* grows in riparian communities and on moist slopes throughout Utah, at 1830–3295 m. It is also known from Montana to North Dakota and southward to New Mexico and Arizona.

Comments: *Columbiana* means “of British Columbia.”

Clematis ligusticifolia Nutt., White virgin's-bower

Description: White virgin's-bower is a dioecious, vigorous woody vine. The stems may be up to 10 m long. The leaves are opposite, pinnately compound, the surfaces sometimes glabrous or villous, and have up to 7 leaflets. The leaflets are ovate to lanceolate, up to 8 cm long, and coarsely few toothed, or sometimes lobed. The flowers may be few or numerous, in bracteate cymes that bloom in June–September. Petals are absent. The sepals are up to 11 mm long and white or cream. The pistillate flowers bear sterile stamens. The achenes are villous, and retain villous styles up to 4.2 cm long.

Habitat and range: White virgin's-bower is largely confined to riparian environments throughout Utah, at 1125–2380 m. It occurs from British Columbia to North Dakota, and southward to New Mexico, Arizona, and California.

Comments: *Clematis ligusticifolia* has good ornamental potential, climbing much like cultivated ornamental *Clematis*. *Ligusticifolia* means “leaves like the genus *Ligusticum*.”

Clematis occidentalis (Hornem.) DC., Purple virgin's-bower

Description: Purple virgin's-bower is a prostrate or sprawling vine, with woody stems up to 3 m long. The leaves have 3 leaflets that are initially pilose, but ultimately glabrate. The leaflets are lanceolate to ovate, up to 11 cm long. The margins may be entire, crenate, or sometimes lobed. The peduncles are up to 15 cm long and recurved near the apex. The flowers are 4 parted and bloom in May–July. The sepals are up to 6 cm long, blue or sometimes white, lanceolate, elliptical to ovate, and ciliate or hairy externally. Petals are absent. The filaments are petaloid. The ovaries have persistent plumose styles, up to 7 cm long. The achenes are up to 5 mm long.



Habitat and range: *Clematis occidentalis* is known from most northern Utah counties, at 2010–2715 m. It also occurs in Colorado, Montana, Oregon, and British Columbia.

Comments: *Occidentalis* means “western.”

*Clematis orientalis** L., Oriental clematis*



Description:

Oriental clematis is an introduced climbing vine, with woody stems up to 3 m long. The leaves are ternate or pinnate-ternate. The leaflets are ovate, elliptic to lanceo-

late, with margins that are entire, coarsely toothed, or even lobed, and up to 5 cm long. The peduncles are up to 12 cm long. The sepals are 4 in number, puberulent, up to 25 mm long, and yellow or yellow tinged with reddish veins. The flowers are solitary, nodding to erect, and bloom in July–September. The filaments are pubescent and petaloid. The ovary is topped by a persistent plumose style, up to 10 cm long. The fruit is an achene, up to 5 mm long.

Habitat and range: *Clematis orientalis* is an Asian native, now established in Cache, Juab, Millard, Salt Lake, Tooele, Uintah, Utah, Washington cos., at 1370–2290 m. It also occurs throughout British Columbia and much of the western United States.

Comments: Oriental clematis is becoming weedy and problematic, especially in riparian habitats. It should be discouraged as a landscape choice. *Orientalis* means “of the east.”



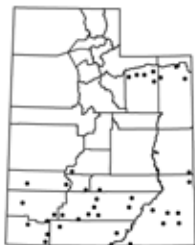
RHAMNACEAE—Buckhorn family

Members of the buckhorn family are mostly shrubs, trees, or woody vines that are distributed in subtropical regions and warm temperate areas. The leaves are simple, with small stipules that are often modified as spines. The flowers are regular, usually with 5 petals, sepals, and a stamen with a well-developed hypanthium. The fruits are usually drupes, but some members of this family have berries or nuts. Many members of this family produce saponins, alkaloids, and calcium oxalate crystals. Some have been used medicinally, others produce natural green and yellow dyes, and many are used for ornamentals. Some species, such as *Ceanothus velutinus*, have symbiotic nitrogen-fixing bacteria that convert atmospheric nitrogen to usable forms. In Utah, there are two native genera and six species of woody plants from this family.

Ceanothus L.

Ceanothus is Greek for “a spiny plant.”

Ceanothus fendleri A. Gray, Fendler’s mountain lilac



Description: Fendler’s mountain lilac is a spreading or sometimes rounded shrub that may grow up to 8 dm tall. The stems are thorny, or occasionally unarmed. The leaves are alternate, deciduous, short petioled, up to 24 mm long and 14 mm wide, shiny green above, and pale beneath, with bare short hairs that persist on older leaves. The blades are elliptical to oblong-ovate, with acute tips. The margins are entire or serrulate. The white petals are up to 1.8 mm long, long clawed, and bloom in June–August. The capsules are up to 5 mm thick, 3 lobed, and bear shiny brown seeds.

Habitat and range: *Ceanothus fendleri* is most common in ponderosa pine or mixed conifer woodlands and, infrequently, in pinyon-juniper woodlands, at 1950–2840 m, throughout the southern third of Utah and in the Uinta Mountains. It also occurs in Arizona, New Mexico, South Dakota, Texas, and Wyoming.

Comments: *Fendleri* is named after August (Augustus) Fendler, a 19th-century German-born professional plant collector.

***Ceanothus greggii* A. Gray**



In Utah, this species consists of two somewhat distinctive varieties. Both have opposite branching, lack spines or thorns, and have tomentose branchlets.

***Ceanothus greggii* var. *franklinii* S. L. Welsh, Franklin's ceanothus**

Description: Franklin's ceanothus is a small shrub, up to 5 dm tall. The plants are intricately branched. The flowers are usually blue and bloom in April–May. The fruit is a 3-lobed capsule.

Habitat and range: *Ceanothus greggii* var. *franklinii* grows in pinyon-juniper, Colorado Plateau shrub, and mountainbrush communities, at 1645–1895 m, in Grand and San Juan cos.

Comments: *Greggii* is named after Josiah Gregg, a naturalist, trader, and explorer of the southwestern United States, and *franklinii* honors M. A. "Ben" Franklin, a present-day botanist with the Utah Natural Heritage Program. Franklin's ceanothus is a rare endemic and of conservation concern.

***Ceanothus greggii* var. *vestitus* (Greene) McMinn, Mojave ceanothus**



Description: Mojave ceanothus is a shrub, up to 20 dm tall, and very intricately branched. The flowers are usually white and bloom in April–May. The capsules are 3 lobed.

Habitat and range: This variety grows in xeric sagebrush, pinyon-juniper, and mountainbrush communities in the Virgin River drainage system in Iron and Washington cos., at 1220–2870 m. It also occurs in Arizona, California, Nevada, New Mexico, and Texas.

Comments: *Vestitus* mean "clothed with a covering of hair."

Ceanothus martini M. E. Jones, Martin's ceanothus

Description: Martin's ceanothus is a medium-sized shrub, growing up to 8 dm tall. The plants are spreading or rounded and lack thorns. The leaves are alternate, deciduous, and short petioled. The leaf blades are 3-nerved from the base, strigose below, especially on the veins, and elliptical to ovate, up to 30 mm long and 22 mm wide, with entire or serrulate margins. The inflorescence is corymbose and flowers in June–July. The sepals are up to 1.2 mm long. The petals are white and up to 2.4 mm long. The capsules are shallowly 3 lobed, up to 5 mm thick, and bear shiny, brown seeds.

Habitat and range: Martin's ceanothus grows in pinyon-juniper, sagebrush-grass, mountainbrush, ponderosa pine, aspen-mixed conifer, and bristlecone pine communities throughout Utah, at 1830–2930 m. It is also known from Arizona, Colorado, Nevada, and Wyoming.

Comments: *Ceanothus martini* is beautiful in flower, easy to grow, drought tolerant, and should be considered for native landscaping. *Martini* is named after Dr. William P. Martin, plant photographer and field companion of 20th-century botanist Lyman David Benson.

Ceanothus velutinus Douglas, Deer-brush

Description: Deer-brush is a spreading to rounded shrub that may be up to 1.5 m tall. The leaves are alternate, evergreen, elliptic to oblong, up to 8.4 cm long and 5.5 cm wide, with serrulate margins and 3 strong veins that diverge from the base, shiny green above, and pale green and velvety below. The flowers are borne in corymbose inflorescences that bloom in May–August. The sepals are up to 1.4 mm long and white. The petals are up to 2.5 mm long and white. The 3-lobed capsules are up to 4 mm thick and have shiny tan seeds that are up to 2.5 mm long.



Habitat and range: *Ceanothus velutinus* occurs in sagebrush-grass, mountainbrush, ponderosa pine, aspen-mixed conifer, and spruce-fir communities in northern and central Utah, at 1890–3355 m. It is also known from California, Colorado, Nevada, South Dakota, and British Columbia.

Comments: Deer-brush is important because of nitrogen-fixing actinomycetes of the genus *Frankia* that live in the root nodules. It is an attractive ornamental. *Ceanothus velutinus* is considered a pioneer plant, as the seeds readily sprout after fire, logging, and other disturbances, quickly stabilizing the soil. It has a sticky varnish, with a distinctive odor, resembling cinnamon, balsam, or walnut, when the leaves are crushed. *Velutinus* means “velvety.”

***Rhamnus* L.**

Rhamnus is Greek for “buckthorn.”

***Rhamnus alnifolia* L'Hér., Alder buckthorn**



Photo by Richard Shaw© Intermountain Herbarium, USU



Description: Alder buckthorn is a shrub that grows up to 1.5 m tall. The leaves are deciduous, alternate, and pinnately veined, up to 8 cm

long, elliptic to ovate, with serrulate margins, and glabrate to puberulent on 1 or both surfaces. The inflorescence is an umbel, with 1–3 flowers that bloom in May–July. The flowers are imperfect and usually 5 parted. The pedicels are up to 6 mm long. The calyx is up to 3 mm long. Petals are lacking. The fruits are usually subglobose drupes, black, 3 seeded, and up to 8 mm long.

Habitat and range: *Rhamnus alnifolia* occurs in aspen-mixed conifer communities in Davis and Salt Lake cos., at about 2200 m. It is also known from California, Idaho, Wyoming, and southern Canada (from British Columbia to Newfoundland).

Comments: *Alnifolia* means “alder-like leaves.”

***Rhamnus betulifolia* Greene, Birchleaf buckthorn**



Description:

Birchleaf buckthorn grows up to 2.5 m tall. The leaves are simple, alternate, deciduous, up to 15 cm long and 8.5 cm wide, elliptic to obovate, abruptly

short acuminate, hirtellous on 1 or both surfaces, sometimes becoming subglabrate at maturity, and pinnately veined, with up to 12 veins on each side of the midvein. The inflorescences arise in the leaf axils and produce up to 7 flowers that bloom in May–June. The flowers are perfect and 5-parted. The sepals are up to 2.5 mm long. The petals are about 1 mm long and brownish. The fruits are subglobose drupes, up to 10 mm long, and usually produce 3 seeds.

Habitat and range: Birchleaf buckthorn grows in rock crevices, hanging gardens, and shady coves in central and southern Utah, at 975–1895 m. It is also known from Arizona, Nevada, New Mexico, and Texas.

Comments: The bitter fruits of *Rhamnus betulifolia* are eaten by many species of wildlife. *Betulifolia* means “birch-like leaves.”



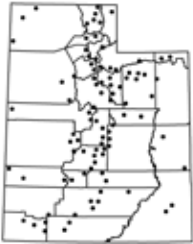
ROSACEAE—Rose family

The rose family consists of trees, shrubs, and perennial herbs that are often armed with thorns or prickles. Members of this family are well distributed throughout the world, mainly in temperate climates. The leaves are usually alternate (*Coleogyne* has opposite leaves) and usually have stipules. The flowers are regular and usually have a cup-like hypanthium. Most flowers have 5 petals, 5 sepals, and 5 to many stamens. Many species have a superior ovary, but a few genera, such as *Malus* (apples) and *Pyrus* (pears), have an inferior ovary. Many fruits in this family provide food for humans (plums, peaches, cherries, almonds, apricots, strawberries, raspberries). Over 3000 years of cultivation have resulted in roses that vary in the number of petals, fragrance, color, and growth habit. Rose “hips” (fruits) are used as a source of vitamin C. Seeds of Rosaceae may be poisonous, due to the presence of compounds that release cyanide when digested. Laetrile, an ingredient in apricot seeds, has been used to treat some types of cancer. Members of the rose family are used for wood, perfume, and ornamentals. This family is well represented by woody species in Utah.

***Amelanchier* Medik.**

Amelanchier is French for “serviceberry.”

Amelanchier alnifolia (Nutt.) Nutt. ex M. Roem., Serviceberry



Description: Serviceberry is a robust shrub that may grow up to 5 m tall. The stems are glabrous and brownish when young, eventually becoming gray. The leaves are simple, alternate, up to 6 cm long and 4 cm wide, and rounded or subcordate basally. The petioles are distinct and up to 3.5 cm long. The stipules are linear and early deciduous. The leaf blades are oval to oblong and glabrate or hairy on both surfaces. The margins are serrate toward the tip. The sepals are up to 4.6 mm long and narrowly triangulate. The petals are white to pale pink, spatulate, and up to 5 mm long. The ovaries are inferior. The flowers appear in May early July. The

fruits are succulent pomes, up to 1.4 cm long, purple to black, fleshy at maturity, glaucous, and subglobose.

Habitat and range: Serviceberry grows in sagebrush-grass, riparian, mountainbrush, aspen-mixed conifer, and spruce-fir communities, at 1220–2900 m, in all Utah counties. It also occurs in most of northern and western North America.

Comments: *Amelanchier alnifolia* provides food and cover for wildlife. It is a good native landscape plant. The berries were an important food source for Native Americans, and they can be eaten raw or used in jams or jellies. *Alni* means “alder” and *folia* means “leaf.”

***Amelanchier utahensis* Koehne, Utah serviceberry**



Description: Utah serviceberry grows up to 4 m tall, with intricately branched stems that are unarmed, brownish, and glabrous. The leaves are deciduous, alternate, petiolate, 1–3 cm long and equally wide, and hairy on 1 or both surfaces or, sometimes, glabrous. The sepals are up to 3 mm long. The petals are white or sometimes pink tinged, spatulate to elliptic, up to 10 mm long, and appear in May–June. The ovaries are inferior. The pomes are up to 12 mm long, becoming dry and orangish yellow or white at maturity.

Habitat and range: Utah serviceberry grows in riparian, sagebrush-grass, and mountainbrush communities in all Utah counties, at 900–2800 m. It also occurs in all of the western United States and Baja, Mexico.

Comments: *Amelanchier utahensis* provides good cover and food for wildlife. It is also a good ornamental plant for water-wise landscaping. Native Americans mixed the fruit with dried meat to make pemmican. *Utahensis* means “of Utah.”

***Cercocarpus* Kunth**

Cercocarpus means “fruit with a tail.”

***Cercocarpus intricatus* S. Watson, Dwarf mountain mahogany**



Description: Dwarf mountain mahogany is an evergreen shrub, growing up to 2 m tall. The plants are intricately branched. The stems are initially brownish, becoming gray. The leaves are alternate, simple, oblong to elliptic, up to 18 mm long and 1.4 mm wide, and glabrate to strigose or villous, with revolute margins. The sepals are up to 1.2 mm long. Petals are lacking. The flowers appear in April–June. There are 10–20 stamens, and the ovary is superior. The achenes have persistent plumose styles up to 4 cm long.

Habitat and range: Dwarf mountain mahogany prefers rimrock, cliffs, and slopes in xeric sagebrush, pinyon-juniper, mountainbrush, and ponderosa pine communities. It is widespread in Utah, at 1370–2900 m. It also occurs in Arizona, California, and Nevada.

Comments: *Cercocarpus intricatus* provides year-round forage for deer, bighorn sheep, and mountain goats. *Intricatus* means “intricate.”

***Cercocarpus ledifolius* Nutt., Curl-leaf mountain mahogany**

Description: Curl-leaf mountain mahogany is a large shrub or small tree that is often single stemmed and densely branched. The leaves are alternate, evergreen, leathery, and elliptic to oblong, with revolute margins. The leaf surfaces are polished and glabrous, dark green above, and paler beneath. The flowers are perfect, up to 10 mm long, lack petals, and bloom in May–June. The achenes are up to 8 mm long, with persistent plumose styles that are 4–10 cm long, spirally coiled, and very showy at maturity.

Habitat and range: Curl-leaf mountain mahogany grows in pinyon-juniper, mountainbrush, aspen-mixed conifer, and spruce-fir communities. It is known from all Utah counties, at 1400–3000 m. It also grows in Arizona, California, Colorado, Idaho, Montana, and Washington.



Comments: *Cercocarpus ledifolius* is easily killed by fire and does not resprout. The wood gives off good heat when ignited and burns slowly, making it a good fuel. The wood is very hard and dense, and so heavy that it does not float in water. The feathery plumes of the fruit twist as they dry, and such twisting may cause the sharp seeds to be driven into the ground. Curl-leaf mountain mahogany provides very good forage for big game, as well as cover and nesting sites for many birds, such as blue grouse, and small mammals. *Ledifolius* means “*Ledum*-like leaf.”

***Cercocarpus montanus* Raf., Alderleaf mountain mahogany**



Description: Alderleaf mountain mahogany is a deciduous shrub that grows up to 4 m tall. The leaves are simple, alternate, obovate to orbicular,

up to 4.5 cm long and 2.5 cm wide, glabrous above, and pubescent or sometimes glabrate below, with crenate or serrate margins and a cuneate base. The sepals are up to 1.7 mm long, and the flowers bloom in May–June. The stamens may be up to 40 in number. The achenes are up to 12 mm long and have showy, plumose, persistent styles, up to 10 cm long.

Habitat and range: Alderleaf mountain mahogany occupies sagebrush-grasslands, mountainbrush, pinyon-juniper, and aspen-mixed conifer communities throughout Utah, at 1400–2800 m. It is also found from Oregon to Wyoming, and southward to Mexico and California.

Comments: *Cercocarpus montanus* is an important browse plant for wildlife and livestock. It is also a good choice for restoration and native landscaping. Alderleaf mountain mahogany has nitrogen-fixing bacteria in its root nodules. It is known to hybridize with other species of the genus where their ranges overlap. *Montanus* means “of the mountains.”

***Chamaebatiaria* (Porter ex W. H. Brewer & S. Watson) Maxim.**

Chamae means “low” and *batiaria* means “bush.”

***Chamaebatiaria millefolium* (Torr.) Maxim., Fern bush**



Description: Fern bush is an aromatic shrub that grows up to 2 m tall. The stems are glabrous, with reddish bark and conspicuous white lenticels on younger stems. The leaves are up to 7 cm long and 2 cm wide, much pinnatifid, with as many as 24 pairs of pinnae along their length, and glandular, with scattered stellate pubescence. The flowers are white, borne in terminal panicles that may be up to 15 cm long, and bloom in July–August. The sepals are green and up to 5 mm long. The petals are white, up to 5 mm long and equally wide, and very showy when in full flower. The fruit is a follicle, up to 6 mm long.

Habitat and range: *Chamaebatiaria millefolium* grows in sagebrush-grass, mountainbrush, aspen-mixed conifer, and spruce-fir communities throughout most of Utah, at 1330–2900 m. It is also known from Arizona, California, Idaho, Oregon, and Wyoming.

Comments: Fern bush thrives in cultivation and is a desirable landscape plant, due to its drought resistance. *Millefolium* refers to the appearance of having a thousand leaves.

***Coleogyne* Torr.**

Coleo means “in a sheath” and *gyne* refers to the female parts.

***Coleogyne ramosissima* Torr., Blackbrush**



Description: Blackbrush is a rounded shrub, growing up to 1.2 m tall, with divaricately branched stems. The leaves are opposite or fascicled, up to 12 mm long and 1.5 mm wide, narrowly oblanceolate, with obtuse to mucronate tips, and thick, with entire margins. The leaf surfaces are strigose. The flowers are solitary, usually apetalous, have a superior ovary, and bloom in April–May. The 4 sepals are yellow and glabrous on the inner surface and reddish-brown, green, or purplish and strigose on the outer surface. There are 20–40 stamens and 1 pistil, with a hairy style. The fruits are glabrous achenes.

Habitat and range: *Coleogyne ramosissima* grows in Mojave Desert shrub and Colorado Plateau shrub communities in the southern counties of Utah, at 760–1830 m. It is also known from Arizona, California, and Colorado.

Comments: Blackbrush differs from most members of the rose family in having 4 petal-like sepals (rather than 5 petals) and opposite branching. Desert bighorn sheep and deer browse this plant, and small mammals eat the seeds. *Coleogyne ramosissima* can form extensive dense stands. *Ramosissima* means “most branched.”

***Crataegus* L., Hawthorn**

Crataegus is Greek for “thorny flowering shrub.”

Hawthorns are a favorite food of birds, and the fruits make good jams and jellies. The fruits are rich in vitamin C. Hawthorns provide important habitat and cover for wildlife. They also protect streambanks from erosion. The hard wood has been used for tools and weapons, and the thorns were used for fishhooks and ear piercing.

***Crataegus chrysocarpa* Ashe, Fireberry hawthorn**

Description: Fireberry hawthorn is a round-topped shrub or small branching tree that grows to 4 m tall. The stems have thorns up to 6 cm long. The simple leaves are up to 6 cm long and equally wide. They are orbicular to obovate, lobed and have acute tips. The leaves are basally obtuse with margins that are doubly serrate or serrulate with teeth that are red-tipped. The petioles often have stalked, red glands. The flowers have sepals that are lanceolate and attenuate to triangular. The petals are white, up to 8.5 cm long and equally as broad. The anthers are 5-10 and yellow. The pomes are red to yellow-orange.

Habitat and Range: This species is known from Blacksmith Fork in Cache County, Utah. It also occurs in the Rocky Mountains from Canada to New Mexico.

Comments: *Crataegus chrysocarpa* is rare in the state and a naturally occurring specimen has not been observed for several decades. It is cultivated as an ornamental. *Chrysocarpa* means “golden fruit”.

***Crataegus columbiana* Howell, Red hawthorn**



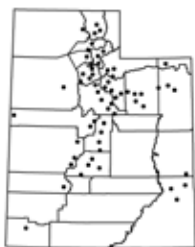
Description: Red hawthorn may grow up to 4 m tall. The stems are armed, with thorns up to 4.5 cm long. The leaves are simple, alternate, elliptic to obovate, and pubescent on both surfaces, with a broadly cuneate base, shallowly lobed tip, and serrate or doubly serrate margins. The petioles are up to 1.5 cm long and lack glands. The corymbs are terminal,

slightly pubescent, and flower in May–June. The sepals are lanceolate, with glandular tips. The petals are white, up to 7.5 mm long and nearly as wide. There are 10 stamens. The fruits are succulent pomes, up to 12 mm thick, and red at maturity.

Habitat and range: *Crataegus columbiana* grows on dry gravelly slopes in the mountainbrush zone of Provo Canyon, Utah Co., at about 1600 m. This species is also known from Idaho and the northwestern United States and Canada.

Comments: Red hawthorn is more common in Idaho and the Pacific Northwest, and it occurs in a single disjunct population in Provo Canyon. *Columbiana* refers to British Columbia.

***Crataegus douglasii* Lindl.**



This species is a small tree or large shrub, up to 5 m tall, usually forming thickets. The thorns are up to 3.5 cm long. The leaves are serrate to doubly serrate and seldom lobed. Two varieties are recognized in Utah.

***Crataegus douglasii* var. *duchesnensis* S. L. Welsh, Duchesne hawthorn**

Description: Duchesne hawthorn may grow up to 7 m tall, but it is usually smaller. The leaves are up to 9.5 cm long, lanceolate to elliptic, cuneate basally, and acute to obtuse apically. The petioles often bear a pair of subbasal glands. The inflorescences are glabrous and bloom in May–June. The sepals are triangular and up to 3.5 mm long. The petals are white, up to 3.8 mm long and at least as wide. There are 10–20 stamens. The ovaries usually have 5 styles. The fruit is a pome, up to 8 mm thick, and purple or black at maturity.

Habitat and range: This variety is known from the Uinta River drainage and along the Colorado River in northeastern Utah (Duchesne and Uintah cos.), at 1800–2450 m. Elsewhere, it is reported from northern Colorado.

Comments: Duchesne hawthorn is endemic to the western Uinta Basin. *Douglasii* is named after David Douglas, a 19th-century Scottish botanist who collected extensively in the United States, particularly in the Pacific Northwest. *Duchesnensis* refers to Duchesne Co.

Crataegus douglasii var. *rivularis* Sarg., River hawthorn



Description: River hawthorn grows as a small tree, with twigs that are deep red and glossy. The leaves are obovate, broadly elliptic to ovate, and usually less than 2 times longer than wide. The petals are up to 8 mm long and equally wide, and the pomes are up to 12 mm thick at maturity. It flowers in May–June.

Habitat and range: This variety is known from most of northern and eastern Utah, at 1370–2530 m. It also occurs in Arizona, Colorado, Idaho, Nevada, New Mexico, and Wyoming.

Comments: *Rivularis* refers to a river or stream habitat.

Crataegus erythropoda Ashe, Rocky Mountain hawthorn



Description: Rocky Mountain hawthorn may grow up to 5 m tall. The branches have strong recurved thorns and reddish bark. The thorns are dark brown and up to 4 cm long. The leaves are petiolate, up to 2.2 cm

long and 5.5 cm wide, rhomboid-ovate to ovate, shiny green above, paler below, and glabrous, with doubly serrate margins, broadly cuneate bases, and (often) shallowly lobed tips. The veins are impressed above and prominent below. The flowers bloom in May–June and are white, with petals that are up to 8.5 mm long, clawed, and suborbicular. There are up to 10 stamens that bear pink or purple anthers. The ovaries are usually 5 styled and mature as fleshy pomes, up to 10 mm thick. The fruits are reddish orange or brownish and glabrous at maturity.

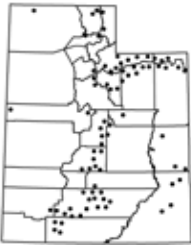
Habitat and range: *Crataegus erythropoda* occurs in Utah only on the east end of the LaSal Mountains, in San Juan Co., at 1800–2700 m. It also is found in Arizona, Colorado, New Mexico, and Wyoming.

Comments: *Erythropoda* means “with red feet.”

***Dasiphora* Raf.**

Dasi means “hairy” or “shaggy” and *phora* means “carrying” or “bearing.”

***Dasiphora fruticosa* (L.) Rydb., Shrubby cinquefoil**



Description: Shrubby cinquefoil is a shrub, up to 1 m tall. The bark becomes shredded on older stems. The leaves are compound, alternate, up to 5 cm long and 2 cm wide, and pinnately lobed, with 3–7 leaflets. The margins are entire and revolute. The leaflets are usually up to 2.5 cm long and 1 cm wide, green above, sparsely hairy, and silver hairy below. The inflorescence is a 3–7 flowered cyme, or the flowers are solitary, occurring in the leaf axils. The flowers bloom in June–August. The sepals are ovate to lanceolate and up to 9 mm long. The petals are rounded, yellow, and up to 14 mm long. The receptacle is hairy. The achenes are white, hairy, and up to 2 mm long.

Habitat and range: *Dasiphora fruticosa* grows in meadows, big sagebrush-grass, aspen-mixed conifer, lodgepole pine, ponderosa pine, and

spruce-fir communities in most Utah counties, at 1700–3500 m. It is also known throughout North America, except for the southeastern United States.

Comments: Shubby cinquefoil is a common cultivated ornamental in western North America. *Fruticosa* means “shrubby” or “bushy.”

***Dryas* L.**

Dryas is named after a wood nymph in Greek mythology.

***Dryas octopetala* L., Mountain avens**



Photo by Jim Harris

Description: Mountain avens is a mat forming, evergreen shrub. The petiolate leaves are up to 4 cm long and 1 cm wide, lanceolate to oblong, obtuse or subcordate basally, with obtuse tips, and usually with stipitate glands on the midvein of the underside. The leaf surfaces may be glabrate or pubescent above and tomentose below. The leaf margins are revolute. The flowers bloom in July–August and are borne singly, on scapes that are up to 11 cm long and tomentose, with stipitate glands. The petals are white, but fade to yellowish, and are up to 15 mm long. The flowers bear multiple pistils that mature into achenes with plumose styles. The styles may be up to 4 cm long.

Habitat and range: *Dryas octopetala* is circumboreal and widely distributed in North America. It is most common in the Uinta Mountains of northeastern Utah, at 3500–3965 m.

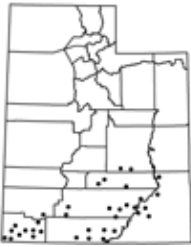
Comments: Mountain avens is a pioneer plant that often dominates and stabilizes soils on mountain slopes. It has nitrogen-fixing bacteria that supply nitrogen to the nutrient-poor soils common at high elevations. The parabolic shape of the flower focuses solar energy on the stigmas, which raises the temperature on the pistil and increases the plant's reproductive success. *Dryas octopetala* is an important food source for ptarmigan and pikas. It is used in rock-garden landscaping. *Octopetala* means “eight petals.”

Fallugia Endl.

Fallugia honors Abbot Virgilio Fallugi, a 17th-century Italian botanist.

***Fallugia paradoxa* (D. Don) Endl. ex Torr., Apache plume**

Description: Apache plume is a deciduous unarmed shrub that may grow up to 1.5 m tall. The bark is scaly. The leaves are up to 16 mm long, fan shaped, terminate in 3–5 lobes, and are covered with fine scruffy scales and stellate hairs. The pedicels are up to 18 mm long. The sepals are up to 7 mm long and broadly ovate, with cuspidate tips. The petals are white, up to 14 mm long and 15 mm wide, and bloom in April–August. There are many pistils per flower. The styles are plumose and persistent on the mature achenes.



Habitat and range: *Fallugia paradoxa* grows in wash bottoms and on rocky outcrops in xeric sagebrush, Colorado Plateau shrub, and pinyon-juniper communities across southern Utah, at 940–2290 m. It is also known from California, Nevada, New Mexico, and Texas.

Comments: Apache plume is an important browse plant for big game and domestic livestock. It is used for erosion control and is a common choice for native landscapes, because of its drought resistance. *Fallugia paradoxa* tolerates fire and will sprout after a burn. The plume on the fruit is said to resemble the headdress of Apache Indians. *Paradoxa* means “contrary,” “unusual,” or strange.”

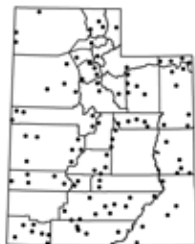
***Holodiscus* (K. Koch) Maxim.**

Holo means “whole” or “entire” and *discus* means “disk,” referring to the entire margins of the disk.

***Holodiscus dumosus* (S. Watson) A. Heller, Mountain spray**

Description: Mountain spray is a densely branched shrub, up to 1.5 m tall. The branches are unarmed and bear simple leaves that are alternate on the spur branches. The leaves are obovate, oblanceolate, or spatulate,

up to 3.2 cm long and 2.3 cm wide, with cuneate bases and margins that are strongly toothed from the middle to the tip, pinnately veined, villous or even glabrate on 1 or both surfaces, and pale beneath. The inflorescence is up to 14 cm long, with white or pinkish petals that are up to 2.2 mm long. Flowering is in late June–August. The achenes are flattened and villous.



Habitat and range: *Holodiscus dumosus* grows on rocky outcrops, in crevices of slickrock surfaces, and along lower cliff bases in all Utah counties, at 1280–3550 m. It also grows in Arizona, California, Idaho, Nevada, New Mexico, Oregon, and Wyoming.

Comments: Mountain spray is a valuable species for revegetation, and it has low water requirements as an ornamental. It has been used for making arrows, spears, and harpoon shafts. *Dumosa* is Greek for shrubby.

***Peraphyllum* Nutt.**

Peraphyllum means “completely or thoroughly leafy.”

***Peraphyllum ramosissimum* Nutt., Squaw apple**

Description: Squaw apple is a deciduous unarmed shrub that grows up to 2 m tall. The leaves are simple and alternate, with entire margins. The stipules are fused to the petioles. The flowers are solitary, perfect, regular, with white or pinkish petals, and bloom in May–July. There are 10–20 stamens. The ovary is inferior, with 2 or 3 styles. The fruit is an apple-like fleshy pome, up to 18 mm thick, and yellowish orange when ripe.

Habitat and range: Squaw apple grows in pinyon-juniper, mountain-brush, and ponderosa pine communities throughout Utah, especially in central and southern Utah, at 1500–2500 m. It is also known from Colorado, Idaho, Oregon, and across the Southwest to California.



Comments: Grouse, wild turkeys, rodents, and other animals eat the seeds and fruits. The fruits of *Peraphyllum ramosissimum* have been used to make jelly. *Ramosissimum* means “most branched.”

***Petrophytum* (Nutt. ex Torr. & A. Gray) Rydb.**

Petro means “rock” and *phyton* means “plant.”

***Petrophytum caespitosum* (Nutt.) Rydb., Rock spiraea**



Description: Rock spiraea is a prostrate, mat-like plant that grows up to 2 dm tall and 10 dm in diameter. The leaves are simple, alternate, oblanceolate to spatulate, up to 17 mm long and 4.5 mm wide, with entire margins, and pilose to almost glabrous on 1 or both surfaces. The inflorescence is a spike-like raceme, up to 12 cm long, with bract-like leaves. The flowers are white, with sepals up to 2.1 mm long. The petals are up to 2.5 mm long and 1 mm wide and bloom in August–September. The follicles are 5 per flower and up to 2.1 mm long.

Habitat and range: *Petrophytum caespitosum* grows on rocky outcrops in sagebrush, mountainbrush, aspen-mixed conifer, and spruce-fir communities. It is common in hanging gardens across the Colorado Plateau. The species occurs throughout Utah, at 1125–3050 m, as well as being common throughout most of the western United States.

Comments: Rock spiraea is used as an ornamental in rock gardens. *Caespitosum* means “tufted.”

***Physocarpus* (Cambess.) Raf.**

Physocarpus is Greek for “inflated fruit.”

***Physocarpus alternans* (M. E. Jones) J. T. Howell, Dwarf ninebark**



Description: Dwarf ninebark is a deciduous shrub that grows up to 12 dm tall and is about as broad. The twigs have a stellate pubescence and may be glandular. The bark is shreddy on older stems. The leaves are ovate, up to 2 cm long and equally wide, with cordate to subcordate bases, usually 3 lobed, with doubly crenate margins, and hairy to nearly glabrate on both surfaces. The inflorescences are subumbellate, with up to 12 flowers that bloom in May–August. The pedicels are up to 10 mm long. The hypanthium has stellate hairs. The sepals are oval to oblong and up to 3.2 mm long. The petals are white, or suffused with pink, and up to 3.2 mm long. The stamens have filaments of 2 markedly different heights. There is 1 densely stellate follicle per flower.

Habitat and range: Dwarf ninebark occurs on rocky outcrops in xeric sagebrush, pinyon-juniper, mountainbrush, and ponderosa pine communities throughout Utah, at 1980–2750 m. It is also known from Colorado, Idaho, and Nevada.

Comments: *Physocarpus alternans* is a good choice for cultivated landscapes. The common name, ninebark, comes from its many layers of bark that shred easily. *Alternans* refers to the alternate leaves.

Physocarpus malvaceus (Greene) Kuntze, Mallow ninebark

Description: Mallow ninebark is a deciduous shrub that grows up to 2 m tall. The twigs are glabrate to minutely stellate pubescent. The bark is shreddy on older branches. The leaves are ovate, up to 8 cm long, with a cordate base, and often 3 lobed, with doubly crenate margins. The corymbs have up to 30 flowers that bloom in June–July. The pedicels are up to 2.3 cm long. The hypanthium is stellate hairy. The sepals are ovate to lance-oblong, up to 4.6 mm long. The petals are white, up to 6.7 mm long and 4.8 mm wide. The follicles are densely stellate hairy and up to 6 mm long, produced in pairs that are fused for half their length.

Habitat and range: Mallow ninebark grows in moist canyon slopes in mountainbrush, aspen-mixed conifer, and spruce-fir communities. It is known throughout northern and central Utah, at 1600–3300 m. It also grows in Idaho, Montana, Nevada, Oregon, Washington, Wyoming, and British Columbia.

Comments: *Physocarpus malvaceus* has spectacular flowers that attract bees and butterflies, and leaves that are very colorful in the fall. It is drought tolerant and a great choice for water-wise landscaping. It forms dense thickets that provide valuable cover and shelter for wildlife. It sprouts vigorously after fire, from horizontal rhizomes. *Malvaceus* refers to the mallow-like leaves.

Physocarpus monogynus (Torr.) J. M. Coult., Mountain ninebark

Description: Mountain ninebark is a deciduous shrub that grows up to 2 m tall. The twigs are glabrous to densely stellate hairy, with bark that becomes shreddy on older stems. The leaves are ovate to suborbicular, up to 4.5 cm long and 3.9 cm wide, often 3 lobed, with cordate bases and double crenate margins, and glabrate on both surfaces or, occasionally, stellate hairy, especially below. The inflorescence is corymbose, with up

to 25 flowers that bloom in May–July. The pedicels are up to 0.8 cm long. The hypanthium is stellate hairy. The sepals are ovate and up to 3 mm long. The petals are white, up to 4 mm long and 3.5 mm wide. The follicles occur in pairs and are substipitate, densely stellate pubescent, and fused to midlength.



Habitat and range: Mountain ninebark grows in canyon bottoms, mountainbrush, aspen-mixed conifer, and Douglas fir communities. It is known from Carbon, Sevier, Utah, and Wasatch cos., at 1650–2150 m. It also occurs Arizona, Colorado, Montana, Nevada, New Mexico, Oklahoma, South Dakota, Texas, and Wyoming.

Comments: *Physocarpus monogynus* is used as an ornamental in native landscaping. It is an important winter browse plant for mountain goats. *Monogynus* refers to the single pistil.

***Prunus* L.**

Prunus is Latin for “plum.”

***Prunus emarginata* (Douglas) Eaton, Bitter cherry**



Description: Bitter cherry may grow up to 4 m tall on favorable sites. The twigs are shiny red. The petioles usually lack glands. The leaves are oblong-obovate to elliptic, up to 5 cm long, and glabrate to sparsely pubescent. The leaf margins are serrulate, and the lower teeth are glandular. The inflorescence is corymbose, up to 4 cm long, and produces up to 10 flowers, blooming in May–July. The hypanthium is campanulate, glabrate, and up to 3 mm long. The sepals are up to 2 mm long. The petals are white, obovate, and up to 7 mm long. The fruit is a drupe, up to 8 mm wide, and red at maturity.

Habitat and range: Bitter cherry grows in mountainbrush, aspen-mixed conifer, and ponderosa pine communities. It is found in Cache and Washington cos., at 1770–2120 m. It also occurs in California, Idaho, Montana, Nevada, Oregon, Washington, and British Columbia.

Comments: Blue grouse and other birds eat the fruits of *Prunus emarginata*, and which are also a preferred food of bears. *Emarginata* refers to a shallow notch at the apex of the leaves.

***Prunus fasciculata* (Torr.) A. Gray, Desert almond**



Description: Desert almond forms intricately branched shrubs, up to 2 m tall. The branches are grayish and often thorn-like at their tips. The leaves are up to 2.5 cm long and sessile or very short petioled. The blades are spatulate and entire, or few toothed, with apiculate tips. The petals are up to 5 mm long, spatulate to elliptical, and white or cream. The sepals, hypanthium, and pedicels are glabrous. The flowers bloom in April through mid-May. The fruit is a drupe, with a thin fleshy outer layer and a hairy surface.

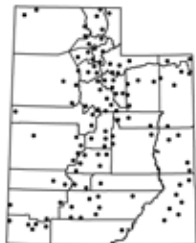
Habitat and range: *Prunus fasciculata* occurs in Mojave Desert shrub, xeric desert shrub, and pinyon-juniper communities in Beaver, Millard, and Washington cos., at 625–1965 m. It is often the dominant shrub along gravelly bottomed, shallow drainage channels in southwestern Utah. It is also known from Arizona, California, and Nevada.

Comments: Desert almond is often covered with tent caterpillars. The fruits are eaten by birds and small mammals. *Fasciculata* refers to the fascicled or clustered leaves.

***Prunus virginiana* L., Chokecherry**

Description: Chokecherry grows as a large shrub or small tree, up to 8 m tall. The plants are often few stemmed but widely branched. The bark

is brown and glabrous on younger stems, becoming gray and roughened with age. The leaves are usually elliptical to oblong-ovate, up to 10 cm long and 7 cm wide. The leaf tips are abruptly acuminate, the bases acute to rounded, and the margins serrate. The petioles are up to 2 cm long and bear a pair of conspicuous glands. The flowering racemes are up to 20 cm long, with up to 20 flowers that bloom in May–mid-July. The fruits are fleshy drupes, becoming purple or black at maturity.



Habitat and range: *Prunus virginiana* occurs in all Utah counties, along streams and moist upland sites, at 1370–3050 m. It is widespread across North America.

Comments: Chokecherry provides important cover, habitat, and food for wildlife, and it protects watersheds. The twigs and branches are often obscured by a fungus (*Apiosporina morbosus*), known as “black knot.” Chokecherry contains a toxic compound (prunasin). The raw fruits can cause cyanide poisoning but, when cooked, are used for jellies, jams, syrup, and wine. *Prunus virginiana* var. *melanocarpa* (A. Nelson) Sarg. is the variety that occurs in Utah. *Virginiana* means “of Virginia” and *melanocarpa* means “black fruit.”

***Purshia* DC. ex Poir.**

Purshia honors Frederick (Friedrich) Traugott Pursh, a late 18th- to early 19th-century botanist and explorer from Saxony who traveled extensively in the eastern United States.

***Purshia glandulosa* Curran, Glandular bitterbrush**

Description: Glandular bitterbrush is a much-branched evergreen shrub, up to 3 m tall. The branchlets are prominently glandular. The leaves are up to 10 mm long and 4 mm wide, 5 lobed, pinnatifid, and tomentose below, with revolute margins and cuneate bases. The funnel-form hypanthium is glabrous to tomentose. The petals are up to 8 mm long, spatulate, creamy white to yellow, and bloom in April–May. There are 1–2 pistils per

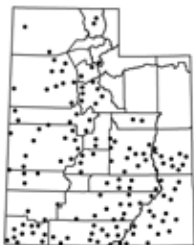


flower. The achenes are up to 8 mm long, densely pubescent, and lack a plumose style.

Habitat and range: *Purshia glandulosa* grows in southern mountainbrush, pinyon-juniper, and low elevation riparian communities in Washington Co., at 1065–1375 m. It is also known from Arizona, California, Nevada and Baja Mexico.

Comments: Glandular bitterbrush may have originated as a hybrid between *Purshia tridentata* and *P. stansburyana*. *Glandulosa* means “having glands.”

***Purshia stansburyana* (Torr.) Henrickson, Cliffrose**



Description: Cliffrose is a beautiful large shrub that may grow up to 3.5 m tall. Older branches have shreddy bark and glandular branchlets. The aromatic leaves are usually 5 lobed at the tip, glandular punctate, and green above, with a white tomentum below. The flowers have 5 pistils, are white to cream or yellowish, with petals up to 9 mm long, and bloom in May–June. The achenes are 5–7 mm long and have plumose styles up to 4.5 cm long.

Habitat and range: Cliffrose is a common shrub in Colorado Plateau shrub, mountainbrush, pinyon-juniper, ponderosa pine, and sagebrush-grass communities in most counties in Utah, at 820–2745 m. It also occurs in Arizona, California, Colorado, Nevada, New Mexico, and Mexico.

Comments: Utah plants are known to intergrade with *P. tridentata*. They are drought tolerant and sun loving, making them a good landscape ornamental. Cliffrose is somewhat unpalatable to browsers. The inner bark has been used by native people of the Great Basin for weaving sandals, mats, and other items. *Stansburyana* honors Captain Howard Stansbury, leader of the first exploration of the Great Salt Lake Valley.

Purshia tridentata (Pursh) DC., Bitterbrush

Description: Bitterbrush can grow up to 2 m tall, but it rarely reaches this height, due to grazing by various herbivores. The trailing branches often root when they come in contact with the soil. The branches are tomentulose. The leaves are up to 20 mm long and 12 mm wide, with revolute margins, 3-toothed at the tip, tomentose but green above, and grayish tomentose below. The petals are yellow, up to 9 mm long, oblong to obovate or spatulate, and appear in April–August. The achenes are obliquely ovoid, up to 12 mm long, and densely pubescent, with a short nonplumose style up to 4 mm long.

Habitat and range: *Purshia tridentata* is found in sagebrush-grass, mountainbrush, pinyon-juniper, and ponderosa pine communities in all Utah cos., at 1220–2775 m. It is also common in much of western North America.

Comments: Bitterbrush is one of the most important and nutritious winter browse plants for wildlife, especially deer. It is drought resistant and makes a good ornamental for low-maintenance landscaping. *Tridentata* refers to the 3-toothed leaves.

Rosa L.

Rosa is Latin for “rose.”

***Rosa nutkana* C. Presl, Nootka rose**

Description: Nootka rose is a deciduous shrub that may grow up to 2 m tall, with stems that are armed with spines below the stipules. The leaves are compound pinnate, with 5–7 leaflets. The leaf surfaces may be pubescent to glabrous, and the margins are serrate to doubly serrate. The flowers are usually solitary, with pink petals up to 4 cm long, and bloom in June–July. The fruits (“hips”) are ellipsoid to subglobose, up to 2 cm long, and red orange to purplish.



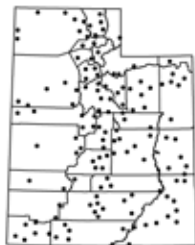
Habitat and range: Nootka rose has been collected throughout Utah cos. except Davis, Kane, Morgan, and Weber and is probably over looked in the these counties. It occurs in mountainbrush, sagebrush-grass, Douglas fir, riparian, and spruce-fir communities, at 1525–3555 m. It also occurs in much of western North America.

Comments: *Rosa nutkana* is very similar to *R. woodsii*, but it differs in having larger flowers and fruits that are more commonly borne singly, rather than in clumps. Like *R. woodsii*, the “hips” remain long into the winter, and are edible and high in vitamins. The flowers are very fragrant, more so than those of *R. woodsii*. Nootka rose sprouts from rhizomes and root-crowns following fire. It hybridizes readily with other members of the genus. *Nutkana* means “of Nootka Sound, British Columbia.”

***Rosa woodsii* Lindl., Woods’ rose**

Description: Woods’ rose is a deciduous shrub, with alternate branching, that may grow up to 2.5 m tall. The branches are armed with prickles and spines. The leaves are compound pinnate, with leaflets that are serrate to doubly serrate. The leaf surfaces are glabrous to pubescent and, rarely, glandular. The flowers usually appear in clusters of 2 or more and bloom in May–July. The petals are usually pink. The fruits are ellipsoid or subglobose “hips” that are up to 1.5 cm long and red, orange, or yellow.

Habitat and range: Woods’ rose occurs in all Utah counties, in a variety of habitats, at 850–3355 m. It also extends throughout much of the western United States and most of Canada.



Comments: Rose “hips” may be eaten as a source of vitamins. They are used for tea or made into jams and jellies. *Rosa woodsii* provides important habitat, food, and cover for wildlife. Its extensive rhizomes and hardiness make it a good choice for reclamation and erosion control. *Woodsii* is named after Joseph Woods, a late 18th- to mid-19th-century English botanist and fern specialist.

***Rubus* L.**

Rubus means “bramble.”

***Rubus idaeus* L., Wild raspberry**



Description: Wild raspberry grows up to 1.5 m tall, and has stems, leaves, and petioles with glandular prickles. The leaves are pinnately compound, with 3–5 leaflets. The leaf surfaces are green, glabrous to hairy

above, and white or gray hairy to glabrate below. The flowers have white petals, up to 7 mm long, and bloom in June–early August. The aggregate fruit is red and very palatable.

Habitat and range: Wild raspberry occupies riparian habitats, and it is also common on talus slopes in aspen-mixed conifer communities. It is common Utah, at 2135–3420 m. but has not been collected in Davis, Morgan, Rich, Wayne, and Washington cos. It also occurs in much of North America and Eurasia.

Comments: Utah's native wild raspberry is *Rubus idaeus* var. *strigosus* (Michx.) Maxim. Most cultivated raspberries belong to *R. idaeus* var. *idaeus*. The fruits are used for jellies, jams, and teas, and are also eaten raw. The young shoots are also edible. *Idaeus* refers to Mt. Ida, in Greece, and *strigosus* refers to the stiff hairs or bristles.

***Rubus leucodermis* Douglas ex Torr. & A. Gray, Black raspberry**



Photo by Richard Shaw © Intermountain Herbarium, USU



Description: Black raspberry grows as a shrub, up to 3 m tall. The branches, petioles, and leaves are armed. The prickles are retrorsely curved, flattened, and catclaw-like. The leaves are up to 14 cm long and pinnately compound, with 3–5 leaflets and linear stipules. The leaf surfaces are green and nearly glabrous above, and white tomentose below. This species has inconspicuous white flowers that bloom in June–July, and it produces dark blue-black fruits that are very palatable.

Habitat and range: Black raspberry occupies dry open slopes in mountainbrush communities and riparian habitats, at 1220–2200 m. It occurs in much of western North America.

Comments: The berries of *Rubus leucodermis* are used in pies and jams. *Leuco* means “white” and *dermis* means “skin” or “covering,” referring to the white coating on the lower side of the leaf.

Rubus neomexicanus A. Gray, New Mexico thimbleberry



Description: New Mexico thimbleberry may grow up to 1.5 m tall. The branches are unarmed. The stems, leaves, and petioles are villous-puberulent and sometimes minutely glandular. The stipules are lance-ovate, with entire or serrate margins. The leaves are simple and palmately lobed, with blades up to 4.2 cm long and 5.5 cm wide, green above and pale green below, and puberulent on 1 or both sides. The large flowers are white, with yellow stamens, and bloom in May–August. The fruits are red and edible.

Habitat and range: In Utah, *Rubus neomexicanus* is generally restricted to hanging garden environments in San Juan Co., at 1130–1160 m. It is also known Arizona, Nevada, and New Mexico.

Comments: *Neomexicanus* refers to New Mexico.

Rubus parviflorus Nutt., Thimbleberry



Description: Thimbleberry can grow up to 2 m tall, with branches, petioles, and leaves that are stipitate glandular and lack spines or thorns. The stipules are lanceolate, with entire or serrate margins. The leaves are simple, palmately lobed, up to 20 cm long and nearly as wide, puberulent on 1 or both sides, green above, and pale green below. The flowers are white, up to 2 cm long, and bloom in June–August. The aggregate fruit is red at maturity.

Habitat and range: Thimbleberry occupies moist soils and riparian habitats in aspen-mixed conifer, Douglas fir, and mountainbrush communities, at 1435–2745 m, in the northern and central counties of Utah. It also occurs from Alaska and Canada to the Great Lakes, and in most of the western United States.

Comments: *Rubus parviflorus* is a beautiful and important plant of the forest understory. It provides cover and protection for wildlife. The berries are very palatable to birds and other wildlife. *Parviflorus* refers to the small flowers.

***Sorbus* L.**

Sorbus is Latin for “mountain ash.”

***Sorbus scopulina* Greene, Rocky mountain ash**

Description: Rocky mountain ash grows as a large shrub or small tree, up to 4 m tall, with grayish-red or yellowish bark. The leaves are alternate and pinnately compound, with 7–13 leaflets that are up to 9 cm long and sharply serrate nearly to the base. The fragrant white to cream flowers are borne on corymbose pubescent inflorescences that bloom in June–July. The sepals are triangular. The fruits are scarlet to orange pomes that become purplish and bitter.

Habitat and range: *Sorbus scopulina* grows in aspen-mixed conifer, spruce-fir, Douglas fir, and ponderosa pine communities throughout Utah, at 1525–3145 m. It also occurs in much of western North America.

Comments: The leaves of Rocky Mountain ash turn a beautiful orange to red in the fall. The fruits are edible after multiple frosts. This is a nice ornamental for native landscaping. *Scopulina* refers to “rocky mountains” or “of rocky places.”



RUBIACEAE—Madder family

The madder family is more common in tropical regions of the world, but it does include some species that occupy temperate areas. The leaves are simple, opposite or in whorls, and usually stipulate, with entire margins. The flowers are regular, have inferior ovaries, and usually occur in small clusters. Many species contain various alkaloids, iridoid compounds, and calcium oxalate crystals in their tissues. There are many economically important members of this family, providing coffee, quinine, and ipecac. Other species have been cultivated, such as gardenias.

Galium L.

Galium is Greek for “milk,” alluding to the use of *Galium* to curdle milk.

Galium multiflorum Kellogg, Shrubby bedstraw



Description: Shrubby bedstraw may grow as a subshrub or a clump-forming perennial herb. The stems may be glabrous or hispid, with leaves in whorls of 4. The leaves are linear to ovate, up to 20 mm long and 8 mm wide, and acute to cuspidate. The greenish-yellow flowers are imperfect, dioecious, occur in narrow panicles, and bloom in June–August. The fruits are covered with long whitish bristles.

Habitat and range: Two intergrading varieties have been described in Utah. *Galium multiflorum* var. *multiflorum* is widely distributed throughout the state, at 975–2900 m, and *Galium multiflorum* var. *coloradoense* (W. F. Wright) Cronquist occurs only in Grand, San Juan, Uintah, and Washington cos., at 1500–2300 m. This latter taxon is also known from Arizona, California, Colorado, Nevada, New Mexico, and the Pacific Northwest.

Comments: *Multiflorum* means “many flowers” and *coloradoense* means “of Colorado.”

***Galium stellatum* Kellogg, Stellate bedstraw**



Description: Stellate bedstraw is a dioecious shrub, up to 1 dm tall, with branches spreading from the base. The stems are scabrous to hispidulous and 4 angled, with a white epidermis that readily peels. The leaves occur in whorls of 4 and are revolute, lance-acerose, hispidulous, and acuminate-cuspidate. The female shrubs bear solitary greenish-yellow flowers at the tips of the branches, blooming in April–May. The male shrubs produce staminate flowers in dense panicles. The fruits are covered with soft spreading hairs.

Habitat and range: Stellate bedstraw grows in crevices of basalt, sandstone, limestone, or dolomite and in open gravelly places. It has been collected in Mojave Desert shrub communities in Washington Co., at 850–1650 m. It also occurs in Arizona, California, Nevada, and Mexico.

Comments: *Galium stellatum* produces many flowers, but it rarely sets seed. *Stellatum* means “star-like,” referring to the spreading leaves or petals.

Galium wrightii A. Gray, Wright's bedstraw



Description: Wright's bedstraw is a subshrub, somewhat woody at the base, with glabrous stems that are 4 angled and clambering. The leaves appear in whorls of 4 and are elliptic to oblong, up to 1.5 cm long, thin, and cuspidate. The small purple flowers are solitary, or paired in the bract axils, and bloom in July–September. The fruits are covered with hooked hairs up to 1 mm long.

Habitat and range: *Galium wrightii* grows in riparian, mountainbrush, ponderosa pine, Douglas fir, and hanging garden communities in Washington Co., at 1310–1985 m. It also occurs from California to Texas and Mexico.

Comments: *Wrightii* honors Charles (Carlos) Wright, a 19th-century American botanist and plant collector.



RUTACEAE—Citrus family

The citrus family is composed primarily of trees and shrubs, with a few herbaceous perennials. They are most common in tropical, subtropical, and warm-temperate regions of the world. Most of the species have some tissues that are aromatic. The flowers are usually 4 or 5 merous. Flies or bees are the principal pollinators. Most of the members of this family contain oils, triterpines, alkaloid compounds, and tissues with calcium oxalate crystals. Economically, they provide foods, including citrus (oranges, grapefruits, lemons, limes) and kumquats. More than 50 species are grown as ornamentals. A few have been used medicinally, and several are used in the perfume industry. In Utah, there are only two woody species belonging to this family.

***Ptelea* L.**

Ptelea is Greek for “elm tree,” alluding to the winged fruits.

***Ptelea trifoliata* L. subsp. *pallida* (Greene) V. L. Bailey, Hoptree**

Description: Hoptree is an aromatic shrub or small tree, with unarmed alternate branches. The leaves are trifoliate. The leaflets are up to 10 cm long and 5 cm wide, ovate to elliptic or linear-lanceolate. The flowers are greenish white and arranged in corymbs up to 5 cm wide, blooming in April–May. The fruit is a flat, orbicular samara, up to 2 cm long, with an odor that resembles hops.

Habitat and range: Hoptree is rare in Utah, and subsp. *pallida* is said to occur in canyons in the most southern part of the state. It is plentiful on limestone in Mohave Co., Arizona.

Comments: *Trifoliata* means “three leaved,” referring to the 3 leaflets.

***Thamnosma* Torr. & Frém.**

Thamnosma means “smelly bush.”

***Thamnosma montana* Torr. & Frém. Desert-rue**



Description: Desert-rue is a strongly scented shrub, growing up to 6 dm tall, with alternate branching and yellowish-green, broom-like stems that are covered with punctate glands. The leaves (when present) are linear-oblong to oblanceolate, up to 15 mm long. The corolla is purple, with greenish or purplish sepals, and blooms in March–April. The fruit is a 2-lobed capsule.

Habitat and range: Desert-rue grows in Kane and Washington cos., at 760–1650 m, in Mojave Desert shrub communities. It also occurs in Arizona, California, Nevada, New Mexico, and Mexico.

Comments: This interesting shrub is an important food plant for some butterfly species, such as the black swallowtail. Special powers were attributed to *Thamnosma montana* by some Native Americans, who believed it would keep snakes away and make trouble for their enemies. *Montana* means “of the desert mountains.”



SALICACEAE—Willow family

The willow family includes mostly trees and shrubs that are widely distributed in northern temperate regions, including the Arctic. It is likely that members of this family grow farther north than any other woody plants, and they are especially common in damp habitats along rivers and streams, or where the water table is very close to the surface. The leaves are usually deciduous, simple, and alternate, bearing stipules. The plants are dioecious. The flowers are usually concentrated in catkins. Petals and sepals are lacking. Poplars are more commonly pollinated by the wind, whereas willows usually have insect pollinators. Both groups have seeds with long hairs that are dispersed by the wind. Many plants in this family contain salicin, chemically related to acetylsalicylic acid (aspirin) and populin. They also contain cyanogenic compounds, tannins, and calcium oxalate crystals. Many of these taxa are cultivated as ornamentals, as well as used for erosion control and land reclamation. Willows have been an important resource for making baskets, mats, and many other useful items. Species within genera of this family readily hybridize, sometimes making identification very difficult. In Utah, there are two genera, *Populus* and *Salix*, with 28 species combined.

Populus L.

Populus is Latin for “poplar,” “cottonwoods,” and “aspen.”

Populus angustifolia E. James, Narrowleaf cottonwood



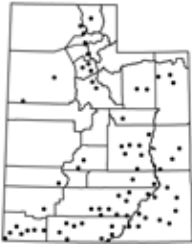
Description: Narrowleaf cottonwood is often one of Utah's tallest riparian trees, growing up to 15 m tall. It has erect-ascending, alternately arranged branches. Glabrous resinous bud scales are a useful diagnostic character for this species. The petiole is short and somewhat dorso-ventrally compressed. The leaf blades are lanceolate to narrowly elliptic or ovate, up to 6 times longer than wide. The tips are usually acute, and the bases are rounded. The leaf margins are finely to coarsely serrate. Flowering occurs

in April–June. The capsules are 2 valved and release seeds that are 2 mm long, with an apical tuft of silky white hairs.

Habitat and range: Narrowleaf cottonwood grows at 1525–2745 m, generally at higher elevations than Frémont's cottonwood. It lines watercourses, along with willow, birch, and other riparian species. Narrowleaf cottonwood occurs throughout Utah, and is also found in much of the western United States, Canada, and Mexico.

Comments: *Populus angustifolia* aids streambank stability, improves fish habitat by shading the water, and provides food, habitat, and building materials for beaver, birds, and other animals. It is one of our most important, yet severely impacted, riparian species statewide. Populations have been reduced by disturbances, such as overgrazing, dredging, and recreational activities, and by competition from introduced species. Since the wood readily decays, narrowleaf cottonwood is not a significant source of lumber. Native Americans used cross sections of the stems for making drums. Hybrids of *Populus angustifolia* and *P. fremontii* (see *P. xintercurrens*) may be found at elevations where the two species overlap. *Angustifolia* refers to the narrow leaves.

***Populus fremontii* S. Watson, Frémont cottonwood**



Description: Frémont cottonwood grows as a large tree, 10–25 m tall, with a crown so broad that it often surpasses its height. The bark, when young, is almost aspen-like, but becomes grayish or brownish and deeply furrowed with age. The petioles are up to 10 cm long, flattened laterally, and lack glands. The leaf blades are up to 10 cm long and 12.5 cm wide, and green on both sides. The margins are coarsely or finely crenate or serrate, with glandular teeth. The leaves may be deltoid to ovate and have truncate, cuneate, or obcordate bases and acuminate tips. Flowering occurs in March–June. The fruiting pedicels are up to 5 mm long. The seeds have a dense apical tuft of white hairs.

Habitat and range: Frémont cottonwood grows in the floodplains of rivers, and along washes and irrigation ditches, at 760–1860 m. It is widespread in much of central, eastern, and southern Utah. It also occurs in Arizona, Colorado, Nevada, and New Mexico.

Comments: *Populus fremontii* was a welcome site to colonizers of the arid West, since it indicated surface water within reach of its roots. The leaves turn a beautiful yellow in the fall. Frémont cottonwood provides shade and nesting habitat for many birds, as well as perching sites for raptors and vultures. It is host to mistletoe and tent caterpillars. After being defoliated by tent caterpillars in the spring, most trees will grow a new set of leaves for the season. Overgrazing in many parts of the state has resulted in reduced recruitment of young cottonwoods that can replace aging trees. *Fremontii* honors John Charles Frémont, a naturalist and early explorer of the American West.

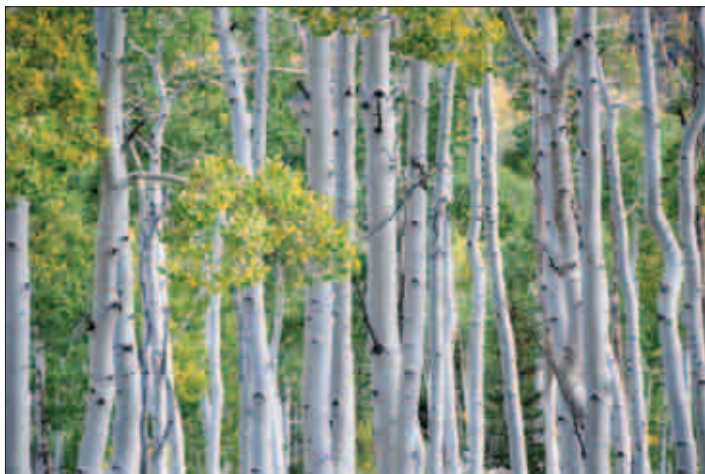
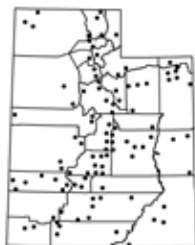
***Populus ×acuminata* Rydb., Lanceleaf cottonwood**



Description: Lanceleaf cottonwood represents a hybrid between *Populus angustifolia* and *P. fremontii*. These trees grow up to 15 m tall, with branches that are pale green to whitish, becoming gray with age. The petioles are up to 5.5 cm long and semiterete or horizontally flattened. The leaf blades are ovate to lanceolate, up to 9 cm long and 4.5 cm wide, ovate to lanceolate with serrate margins. The tips are usually acute and the bases round. It blooms April–June.

Habitat and range: Hybrids may occur along streamsides and rivers, ponds, and lakes where parent types often come together in their ranges. *Populus ×acuminata* has been observed in many Utah counties, at 1370–1920 m.

Comments: *Acuminata* means “a point, or pointed”, referring to the leaf shape.

Populus tremuloides Michx., Quaking aspen

Description: Quaking aspen is a clonal tree that may grow up to 15 m tall. The bark is smooth, whitish, and becomes black and rough at the base. The bud scales are shiny, but hardly resinous. The alternate branches are spreading and form a rather round crown. The petioles are flattened laterally (perpendicular to the leaf blade), causing the blade to “tremble” with the gentlest wind. The leaves are usually up to 6.5 cm long and equally wide, ovate to reniform-cordate, with entire, serrate, or undulate margins. Vigorous shoots may bear leaves that are much larger than normal. The pistillate catkins measure up to 10 cm long and appear in March–July.

Habitat and range: Quaking aspen (the common name is often shortened to just “aspen”) grow along water channels and in open areas in canyons and mountainsides throughout Utah, at 1400–3200 m. It is widespread in North America.

Comments: *Populus tremuloides* may be one of Utah’s most striking trees, especially in the fall, when its leaf color is intensely yellow to nearly red. It is critically important in riparian communities. Aspen is an important colonizer following fire and avalanches, as it primarily reproduces vegetatively, forming large groves of genetically identical trees (clones). It is commonly used for landscaping in sunny open areas. It provides foliage for deer and elk, nesting sites for birds, and food and building materials for beaver, whose dams help regulate the flow of mountain water. Aspen is also good for soil stabilization. It provides shade for the establishment of conifer seedlings, which eventually grow and shade out the aspen. *Tremuloides* refers to the tree’s trembling or quaking leaves.

Populus trichocarpa Torr. & A. Gray, Black cottonwood

Description: Black cottonwood is a clonal tree that grows up to 30 m tall. The buds are large and have resinous scales. The petioles are mostly



terete and up to 6.2 cm long. The leaf blades are usually up to 11 cm long and 8 cm wide, ovate-acuminate, with cuneate to cordate bases, strongly resinous, and fragrant. The upper surface of the leaf is dark green, and the underside is paler. The margins are crenulate, and often have a gland at the end of each tip. The floral bracts are lacerate fringed and deciduous at flowering. Blooming is in April–June. The capsules are 3-carpellate and often densely hairy or glabrate.

Habitat and range: *Populus trichocarpa* is more common along streams and moist areas in the northern part of the state, particularly in the Deep Creek Mountains and the Utah plateaus, at 1370–2350 m. It also occurs in most of western North America.

Comments: *Trichocarpa* refers to the hairy fruit.

Salix L.

Salix is Latin for “willow.”

Young vigorous shoots may have leaves and stipules that are much larger than those of mature shoots. Willows are the preferred food for beaver.

***Salix amygdaloides* Andersson, Peachleaf willow**



Description: Peachleaf willow grows as a large shrub or, more commonly, as a small tree, up to 12 m tall. New branches are yellowish to gray, slender, fragile, and tend to droop. The branches are glabrous, except when young. The bud scales have free overlapping margins. The petioles are slender and up to 15 mm long. The leaves are elliptical to lanceolate, up to 6 cm long and 2 cm wide, with entire to serrulate margins, glaucous below, and green above. The catkins appear with the leaves, in April–May, and are 2.5–11 cm long. The floral bracts are pale, arachnoid hairy, and deciduous. The capsules are glabrous.

Habitat and range: Peachleaf willow grows along streams and in neglected fields and pastures along the Wasatch Front, the Colorado Plateau,

the Uinta Basin, and in Washington Co., at 1070–1800 m. It also occurs in much of the United States, Canada, and Mexico.

Comments: *Salix amygdaloides* is used for revegetation in riparian areas. *Amygdaloides* refers to the almond-like leaves.

***Salix arctica* Pall., Arctic willow**



Photo by Gary Brown

Description: Arctic willow is a very low-growing shrub that creeps along or under the surface of the ground, usually forming mats similar to those of *Salix cascadenensis* and *S. reticulata*, but it is generally more loosely spreading. The petioles are 2–12 mm long. The leaves are up to 5 cm long and 1.6 cm wide, narrowly elliptic to oblanceolate or obovate, with entire margins, and somewhat paler on the underside but not strongly glaucous. Young leaves are loosely villous, becoming glabrate with age. The catkins appear with the leaves, on short peduncles, in June–August. The inflorescence is large and has many flowers, compared to that of *S. cascadenensis* and *S. reticulata*. The capsules are hairy.

Habitat and range: Arctic willow grows at or near timberline in meadows, along lake shores, or on rocky slopes in Beaver, Cache, Duchesne, Piute, Salt Lake, Sanpete, Summit, and Utah cos., at 2775–3600 m. It occurs throughout boreal forests in the Northern Hemisphere.

Comments: *Salix arctica* is important browse for wildlife. It has been used as an ornamental in rock gardens. *Arctica* means “of the Arctic.”

***Salix arizonica* Dorn, Arizona willow**

Description: Arizona willow is a shrub, usually less than 1.5 m tall. The new branches are reddish or, sometimes, yellowish, and may be pubescent or glabrous. The leaves are crowded on the branches, ovate to obovate, usually 1.5–2.5 times longer than wide, green on both sides, not glaucous, and have petioles 3–8 mm long. The leaf blades are glandular

serrulate and acute to obtuse, with cordate or subcordate bases. The floral bracts are brown or black and persistent. The catkins are up to 4 cm long and bloom in June–July. The capsules are glabrous.



Habitat and range: *Salix arizonica* is a high-elevation willow, occurring in Garfield, Iron, Sanpete, and Sevier cos. in open moist meadows, at 2550–3240 m. It also grows in Arizona, Colorado, and New Mexico.

Comments: Arizona willow hybridizes with *Salix brachycarpa* and, possibly, *S. wolfii*. Its range also overlaps with *S. boothii*, but it can be separated from the latter species by its shorter and nonglaucous leaves. *Arizonicus* means “of Arizona.”

***Salix bebbiana* Sarg., Bebb’s willow**



Description: Bebb’s willow occurs as a many-stemmed shrub or a small tree and grows up to 6 m tall. The young twigs are reddish brown or reddish purple, pubescent to glabrate. The petioles are 2–10 mm long. The leaf blades are up to 8 cm long and 3 cm wide, or larger on vigorous shoots. The leaves are elliptic or elliptic-ovate, usually with acute tips, appressed hairy, becoming glabrate, deep green above and more or less glaucous below, with entire or, occasionally, serrate margins. The floral bracts are yellowish or light brown, persistent, and pilose or villous. The catkins appear in May–June. The capsules are hairy.

Habitat and range: *Salix bebbiana* occurs in riparian communities, at 1370–2715 m, in nearly all Utah counties, as well as throughout the northern and western United States and Canada.

Comments: *Bebbiana* honors Michael Schuck Bebb, a 19th-century American botanist and willow specialist.

***Salix boothii* Dorn, Booth's willow**



Description: Booth's willow is a large branching shrub or small tree, growing up to 5 m tall and often forming thickets. The young branches are finely hairy or glabrous, reddish brown to yellowish, and usually have inconspicuous stipules, except in vigorous shoots. The petioles are 3–17 mm long. The leaf blades are up to 8 cm long and 2.5 cm wide, lanceolate to elliptic or oblanceolate, rather thick, firm, slightly hairy, and green on both sides. The tips are acute or shortly acuminate, the bases acute to sometimes rounded, and the margins finely crenate-serrate to entire. The floral bracts are dark brown to black, very woolly, and persistent. The pistillate catkins are 2–4 cm long, and the flowers appear in May–June. The capsules are glabrous.

Habitat and range: Booth's willow grows along stream banks, wet meadows, swamps, seeps, and moist open slopes in all Utah counties except Millard, Rich, San Juan, Washington, and Weber cos., at 2075–3050 m.

Comments: *Salix boothii* is particularly noticeable during winter, creating large stands of orange-yellow thickets. *Boothii* honors William Beat-tie Booth, a friend of David Douglas, the prolific 19th-century Scottish plant collector.

***Salix brachycarpa* Nutt., Short-fruit willow**

Description: Short-fruit willow grows up to 1.5 m tall. Young twigs are reddish brown, with a villous tomentum. The petioles are 1–4 mm long. The stipules are inconspicuous. The leaves are more or less hairy,

especially when young, strongly glaucous on the lower side, and elliptic to obovate. The leaf blade is 2–3 cm long and 0.5–1.5 cm wide, with entire margins. The leaf tips are acute or obtuse, and the bases are usually rounded. The floral bracts are mostly light brown, persistent, and hairy on both sides. The sessile catkins are not much longer than wide and bloom in June–July. The capsules are hairy.



Photo by Sherel Goodrich

Habitat and range: Short-fruit willow grows on riparian sites, in wet meadows, and on dry rocky and talus slopes in Cache, Duchesne, Emery, Garfield, Grand, Iron, Juab, Kane, Morgan, Salt Lake, Sanpete, Sevier, Summit, Uintah, Utah, Wasatch, and Wayne cos., at 2070–3440 m. It also occurs from Alaska south to Oregon and Colorado.

Comments: *Salix brachycarpa* is very similar to and somewhat easily confused with *S. glauca*, but *S. glauca* has larger leaves and longer petioles and catkins. *Brachycarpa* refers to the short fruit.

***Salix cascadiensis* Cockerell, Cascades willow**

Description: Cascades willow is one of the smallest mat-forming, rhizomatous willows. It is usually less than 3 cm tall. The leaves are 18 mm long and 4 mm wide, elliptic, with pointed tips and entire margins, sessile or with short petioles up to 3 mm long, and similar on both sides, but they may be somewhat paler below. The catkins appear with the leaves, in July–August. The floral bracts are dark and persistent, with long hairs. The capsules are hairy.

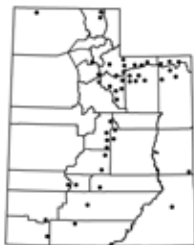


Photo by Sherel Goodrich

Habitat and range: Cascades willow is an alpine tundra species that grows just below the late-persisting snow beds in the Uinta Mountains, at 3200–3935 m, in Daggett, Duchesne, Summit, and Uintah cos. It also occurs in much of the western mountainous region of North America.

Comments: *Salix cascadenensis* is very similar to *S. arctica*, with some intergradation occurring where their ranges overlap. *Cascadenensis* means “of the Cascade Mountains.”

***Salix drummondiana* Barratt ex Hook., Drummond’s willow**



Description: Drummond’s willow grows up to 6 m tall. The new branches are reddish brown, usually heavily pruinose, and glabrous to glabrate. The petioles are 4–12 mm long. The leaf blades of mature branches are up to 8 cm long and 2 cm wide. The leaves are usually elliptic to

lanceolate, rarely oblanceolate, with entire (and sometimes slightly revolute) margins, dark green and glabrous above, and densely silvery sericeous below. Peduncles are absent, or nearly so. The floral bracts are blackish or dark brown and long hairy. The catkins are sessile, or nearly so, and flower in May–July. The capsules are hairy.

Habitat and range: *Salix drummondiana* grows along stream banks and in swampy and moist meadows in Beaver, Box Elder, Cache, Daggett, Davis, Duchesne, Emery, Garfield, Grand, Iron, Kane, Piute, Salt Lake, San Juan, Sanpete, Sevier, Summit, Uintah, Utah, Wasatch, and Wayne cos., at 2000–3290 m. It occurs throughout the mountains of western North America.

Comments: *Drummondiana* honors James Drummond, a late 18th- to mid-19th-century Scottish-born botanist and naturalist who later settled in Australia.

***Salix eriocephala* Michx., Graybark willow**

Description: Graybark willow grows as a large shrub or small tree, 3–8 m tall. Young twigs are slender and yellowish greenish to reddish, and mature branches are ashy white. The petioles are 1–11 mm long. The leaf blades are 2–6 cm long and 9–25 mm wide. The leaves are elliptical to lanceolate, glaucous below, and usually glabrous at maturity, with entire to serrulate margins. The floral bracts are persistent and pubescent, with crisped-villous entangled hairs. The catkins are 1–6 cm long and appear with the leaves, in April–June. The capsules are glabrous.

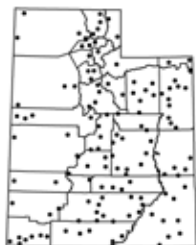
Habitat and range: *Salix eriocephala* occurs in most Utah counties at 1340–2400 m, along ditches and streams. It also is found in much of the western United States.



Comments: The two varieties of graybark willow in Utah are *Salix eriocephala* var. *watsonii* (Bebb) Dorn and *Salix eriocephala* var. *ligulifolia* (C. R. Ball) Dorn. The former variety is more widespread in the state, and

its year-old twigs are predominantly yellowish greenish; var. *ligulifolia* is much less common, with year-old twigs that are mainly red or reddish brown. *Eriocephala* refers to the woolly inflorescence. *Watsonii* is named after Sereno Watson, a botanist for the Clarence King Expedition in California in the 19th century and curator of the Harvard Herbarium. *Ligulifolia* is from the Latin *ligula*, meaning “strap,” and *folia*, meaning “leaf.”

***Salix exigua* Nutt., Sandbar willow**



Description: Sandbar willow is one of Utah’s most commonly observed willows, forming thickets that stand 2–3 m tall. The leaves are linear, up to 12 cm long and 1.5 cm wide, short petioled, hairy, and sometimes glabrous. The margins are entire or serrulate dentate, with glandular teeth. The floral bracts are yellow, pointed, and more or less villous. The catkins bloom in April–August. The capsules are glabrous or hairy.

Habitat and range: Sandbar willow usually occurs in riparian and other moist habitats, including on saline soils, throughout Utah, at 825–2590 m. It is also common throughout North America.

Comments: The long straight branches of *Salix exigua* have historically been used by indigenous peoples for making snowshoes, baskets, fish traps, and arrows. *Exigua* refers to the slender flexible stems.

Salix fragilis** L., Crack willow

Description: Crack willow grows up to 20 m tall. A good diagnostic characteristic for this tree is the ascending brittle branchlets that break readily at the base. The stipules are small and semicordate. The petioles are 7–20 mm long. The leaf blades are narrowly lanceolate to lance-elliptic, 3–17 cm long and up to 3.5 cm wide, with acute to acuminate tips and serrate margins, glaucous on the underside, and glabrous when mature. The flower bracts are pale and deciduous in fruit. The catkins appear with the leaves and bloom in April–May. The capsules are glabrous.



Habitat and range: This large willow is commonly naturalized along irrigation watercourses, natural waterways, and lake margins in many of the northern and central Utah counties, at 1370–2075 m. Originally from Eurasia, crack willow is now common throughout the United States.

Comments: *Salix fragilis* may be confused with *S. amygdaloides*, but the former does not have the bud scales with free overlapping margins, as does *S. amygdaloides*. Crack willow is used as an ornamental shade tree. *Fragilis* refers to its fragile or brittle branches.

***Salix geayeriana* Andersson, Geyer's willow**



Description: Geyer's willow is a large shrub that may grow up to 5 m tall. Young branches are usually strongly glaucous, smooth, slender, and red brown to purplish brown. The petioles are 3–10 mm long, with minute and early-deciduous stipules. The leaf blades are narrowly lance-elliptic to elliptic, over 4 cm long and 4–6 times as long as wide, with sharply

acute or subacuminate tips and entire margins, and glaucous beneath. The floral bracts are persistent, tawny to light brown, and villous or villous puberulent. The catkins are usually less than 2 cm long and appear with the leaves, in May–June. The capsules are hairy.

Habitat and range: Geyer's willow is found in Beaver, Cache, Daggett, Duchesne, Emery, Garfield, Iron, Kane, Rich, Salt Lake, Sevier, Summit, Uintah, Utah, Wasatch, Washington, and Wayne cos., at 2195–2990 m, along streams and in wet meadows. It is common in the Uinta Mountains. It also occurs from British Columbia to California in western North America.

Comments: The Utah variety is *Salix geeyeriana* var. *geeyeriana*. *Geyeriana* honors 19th-century German botanist Karl Andreas Geyer, a participant in several expeditions to various parts of the United States in the 19th century.

Salix glauca L., Gray willow



Photo by Sherel Goodrich



Description: Gray willow is a low-growing branching shrub, 3–15 dm tall. Young twigs are usually reddish brown to grayish and pubescent, sometimes glabrate. The epidermis of young stems often exfoliates between the nodes, in translucent flakes. The petioles are yellowish and 3–10 mm long. The leaf blades are elliptic, 2.5–4.5 cm long and 1–2 cm wide. The leaves are often hairy and usually glaucous on the lower side. The floral bracts are hairy and tawny to brownish or black. The catkins appear on the leafy peduncles, with the leaves, in July–August. The capsules are hairy.

Habitat and range: Gray willow grows in wet meadows, by stream-sides, on talus slopes, and in dry alpine meadows, at 2775–3660 m, in Cache, Daggett, Duchesne, Salt Lake, Sanpete, Summit, Uintah, Utah, and Wasatch cos. It is circumboreal.

Comments: In Utah, plants belong to *Salix glauca* var. *villosa* Anderson. *Glauc*a refers to the bluish green or gray of the foliage. *Villosa* means “hairy” or “shaggy.”

***Salix gooddingii* C. R. Ball, Black willow**



Description: Black willow usually grows as a large tree, 6–10 m tall. Young twigs are yellowish and glabrous. The bud scales have free overlapping margins. The petioles are 3–7 mm long, with inconspicuous stipules up to 8 mm long. The leaves often droop and are lanceolate, acuminate, entire, and often glandular serrulate, with blades 2–7.5 cm long and 6–16 mm wide. Both leaf surfaces are green, similar in color, and glabrous as they mature. The floral bracts are pale and deciduous in fruit. The catkins appear with the leaves, in April–May. The capsules are glabrous or hairy.

Habitat and range: Black willow is common in the southern part of the state, at 825–1585 m, along riverbanks, washes, and streams in Garfield, Grand, Kane, San Juan, and Washington cos. It also occurs from Kansas to California and south to Mexico.

Comments: *Gooddingii* honors Leslie Newton Goodding, a late 19th- to mid-20th-century American botanist who was one of the first botanists to explore southern Arizona.

***Salix laevigata* Bebb, Red willow**

Description: Red willow is more often tree-like than shrubby, usually 2–12 m tall, with a trunk up to 3 dm thick. The greenish to dark gray bark becomes deeply furrowed with age. The bud scales have overlapping free margins. Year-old twigs are reddish or brownish, more or less glabrous, or covered in a tomentum that persists only above the axils. The leaf blades are glabrous above and conspicuously pale, and glaucous and mostly glabrous below. The leaves are mostly lanceolate, with a long, tapering, pointed tip. The margins are entire or obscurely serrulate. The floral bracts

are yellowish, with arachnoid villous hairs within. The catkins bloom in April–May on the leafy branches. The capsules are glabrous.



Habitat and range: Red willow occurs in Grand, Kane, San Juan, and Washington cos., at 700–1930 m. It also is found in the southwestern regions of North America.

Comments: Some authors have included *Salix laevigata* with the more southern species *S. bonplandiana*. *Laevigata* means “smooth” or “slippery,” and may refer to the smooth glabrous leaves or the glabrous capsules.

***Salix lasiolepis* Benth., Arroyo willow**



Description: Arroyo willow may grow to be a small tree, up to 6 m tall. Young stems are yellowish olive to reddish, with short plump buds. The petioles are 5–15 mm long, with minute deciduous stipules. Mature leaf blades are thick and firm, 3–11 cm long and 0.5–2.5 cm wide, oblanceolate to oblong to elliptic, with entire to shallowly toothed and somewhat

revolute margins, dark green above, and conspicuously paler and glaucous below. The catkins usually appear before the leaves, are up to 7 cm long, and bloom in April–May. The floral bracts have a dense fringe of straight hairs. The capsules are glabrous.

Habitat and range: *Salix lasiolepis* grows along streams and washes, at 1360–2330 m, in Beaver, Iron, Juab, Kane, Millard, Piute, Sanpete, Sevier, Tooele, Utah, and Washington cos. It also occurs in much of western North America.

Comments: *Lasiolepis* means “woolly scaled.”

***Salix lucida* Muhl., Whiplash willow**



Description: Whiplash willow grows as a large shrub or small tree, and may be up to 6 m tall. Young branches are glabrate and yellow brown to reddish brown or gray brown. The petioles are 3–15 mm long and usually bear 2 or more glands on the upper side, near the leaf base. This is a good distinguishing characteristic. The stipules are often foliaceous and gland toothed. The leaf blades are lanceolate, elliptical to narrow elliptical, 5.5–11.5 cm long and up to 2 cm wide, and taper to a long-acuminate tip. The leaves are usually not glaucous. The floral bracts are pale and deciduous in fruit. The catkins appear with the leaves, are 1.7–10 cm long, and bloom in April–June. The capsules are glabrous and 4–7 mm long.

Habitat and range: Whiplash willow occurs along streams, by lake margins, and in wet meadows, at 1525–2625 m, and is widespread throughout Utah. It also grows from Alaska to California and New Mexico.

Comments: Utah plants belong to *Salix lucida* var. *caudata* (Nutt.) Cronquist. *Lucida* means “bright,” “shiny,” or “clear” and *caudata* means “tail.”

***Salix melanopsis* Nutt., Dusky willow**

Description: Dusky willow usually grows as a shrub, but it can be up to 5 m tall. Young twigs are smooth and gray or red brown. The stipules are short lived and very small. The petioles are 0.5–6 mm long. The leaves

are linear to narrowly elliptic, 3–12 cm long and 0.2–1.3 cm wide, with somewhat serrulate or entire margins, usually green, and glabrate. The floral bracts are pale and deciduous. The catkins bloom in May–June. The capsules are glabrous and up to 8 cm long.



Habitat and range: *Salix melanopsis* is known only from northern Utah. It grows along rocky streambanks and floodplains, from foothills to the mountains. It also occurs in much of northwestern North America.

Comments: *Melanopsis* means “black.”

Salix monticola Bebb, Mountain willow



Description: Mountain willow usually is 1.5–5 m tall and forms thickets along stream banks and in swamps and wet meadows. New twigs are reddish to yellow. The petioles are 5–10 mm long. The leaf blades are ovate, lanceolate, or elliptic to obovate, usually 3–8 cm long and up to

3 cm wide, with crenate-serrate or subentire margins, glabrous above, and glaucous below. The floral bracts are dark and persistent in fruit. The catkins appear before or with the leaves, are 1–5 cm long, and bloom in May–June. The capsules are glabrous and 4–7 mm long.

Habitat and range: Mountain willow occurs in Beaver, Garfield, Grand, Piute, San Juan, Sanpete, Sevier, Uintah, and Wasatch cos. at 2195–3200 m. It also is found in Arizona, Colorado, New Mexico, and Wyoming.

Comments: *Salix monticola* may easily be confused with *S. boothii*, which lacks glaucous leaves, and *S. eriocephala*, which has longer and more linear leaves. *Monticola* means “living in the mountains.”

***Salix planifolia* Pursh, Plane-leaf willow**



Description: Plane-leaf willow usually grows up to 2 m tall, but in favorable conditions it may reach 5 m. Year-old twigs are shiny, dark brown or reddish brown to deep red or lustrous black. The internodes often exfoliate in translucent flakes or strips. The stems are usually glabrous and rarely glaucous. The stipules are small and usually deciduous. The petioles are 2–10 mm long. The leaf blades are usually 3–5 cm long and 1–2 cm wide. Most leaves are elliptical, with entire margins (or they may have minute teeth). Mature leaves are glabrous, shiny and dark green above, and glaucous and glabrous to sparingly pubescent below. The floral bracts are dark and persistent in fruit. The catkins occur on short peduncles that bloom in June–July. The capsules are hairy.

Habitat and range: *Salix planifolia* grows in streamside meadows, along the margins of lakes and ponds, and in other wet places, at 2255–3660 m, in Beaver, Daggett, Duchesne, Garfield, Iron, Piute, Salt Lake, Sanpete, Sevier, Summit, Uintah, Wasatch, and Wayne cos. It also occurs in eastern Arizona, California, Nevada, and New Mexico.

Comments: *Planifolia* refers to the flat leaves.

Salix reticulata L., Snow willow



Photo by Gary Brown

Description: Snow willow is a mat-forming dwarf shrub, 1–10 cm tall, that creeps at or just below ground level. The petioles are 1–12 mm long. The leaf blades are usually ovate, obovate, orbicular, or (occasionally) broadly elliptic, 0.5–3 cm long and 0.3–2 cm wide, with entire margins. The leaves are glabrous and green above, glaucous below, and strongly reticulate veined. The floral bracts are pale and persistent in fruit. The catkins appear after the leaves and bloom in June–August. The capsules are hairy.

Habitat and range: Snow willow is one of our truly alpine tundra species, found on open rocky slopes and ridges, at 2985–3965 m, in Daggett, Duchesne, Grand, Salt Lake, San Juan, Summit, Utah, and Wasatch cos. It is circumboreal.

Comments: Utah specimens belong to *Salix reticulata* var. *nana* Andersson. *Reticulata* refers to the reticulate or netted veins, and *nana* means “dwarf.”

Salix scouleriana Barratt ex Hook., Scouler's willow

Description: Scouler's willow is a small tree or large shrub, 2–8 m tall. Older stems are reddish brown to yellow brown, usually pubescent, and have a “skunky” odor when freshly peeled. The stipules are small, inconspicuous, and deciduous, except on young vigorous shoots. The petioles are up to 11 mm long. The leaf blades are elliptic to oblanceolate, spatulate, or ovate, up to 8 cm long and 3 cm wide, and, on larger leaves, may have entire to finely serrate or even coarsely crenate or serrate margins. The leaves are hairy when young, at maturity becoming dark green and glabrous above, and usually glaucous and sparsely reddish-strigulose below. The floral bracts are dark and persistent in fruit. The catkins appear before the leaves and bloom in April–June. The capsules are hairy, with a long beak.

Habitat and range: Scouler's willow occurs in nearly all Utah counties, at 1400–3355 m. except Kane, Piute, and Wayne. It also grows in much of the northwestern United States and Canada.



Comments: *Salix scouleriana* is the only Utah willow found growing on drier upland slopes, especially in avalanche areas, and it often occurs with aspen. *Scouleriana* honors John Scouler, a 19th-century Scottish botanist who was one of the first collectors to visit the Galápagos Islands, and who sailed with fellow Scot botanist David Douglas on the Vancouver Expedition.

***Salix wolfii* Bebb, Wolf's willow**



Description: Wolf's willow is a short thicket-forming willow up to 1.5 m tall. Young twigs are reddish, yellow, or orange, becoming brown

with age. The stipules are 1–5 mm long, leaf-like, often glandular serrate, and deciduous. The leaves are elliptic to lanceolate or oblanceolate, up to 6 cm long and 1.5 cm wide, with acute tips and entire margins, and somewhat sericeous on both sides, but not glaucous. The floral bracts are dark brown or blackish, wooly-villous, and well over 1 cm long. The catkins are rather short and appear with the leaves, in June–July. The capsules are up to 5 mm long and mostly glabrous.

Habitat and range: In Utah, Wolf's willow grows along streamsides and by the margins of lakes and ponds, at 2470–3290 m, in Cache, Daggett, Duchesne, Emery, Sevier, Summit, Uintah, Wasatch, and Weber cos. It also occurs in much of the western United States.

Comments: In Utah, this species is represented by *Salix wolfii* var. *wolfii*, which has glabrous capsules. *Wolfii* honors Carl Brandt Wolf, a 20th-century American botanist at the Rancho Santa Ana Botanical Gardens.



SAPINDACEAE—Soapberry family

The soapberry family includes trees, shrubs, vines, and herbs, with its members found in tropical to northern temperate regions throughout most of the world. The flowers are usually small, inconspicuous, perfect or imperfect, usually functionally unisexual, and 4–5 merous, with a superior ovary and usually with a well-developed nectar disk. Many contain saponins, many have milky sap, and some are toxic. Numerous species in this family have economic value: tropical fruits; seeds, sugars, and syrups obtained from several species of maple; lumber; soap; and cosmetics. The drink *guarana* is made from the seeds of *Paullinia cupuna*. Most members of this family are pollinated by insects and birds attracted to their nectar. A few are pollinated by wind. Woody representatives of the soapberry family native to Utah include three species in the genus *Acer*, formerly in the family Aceraceae, but which is now included as a subfamily in Sapindaceae.

Acer L.

Acer is Latin for “maple.” The leaves are palmate and opposite. The fruits are double samaras.

Acer glabrum Torr., Rocky Mountain maple



Description: Rocky Mountain maple usually has a shrubby growth habit, with multiple stems, or it may grow as a small tree, up to 8 m tall on favorable sites. The leaves are deciduous, opposite, palmately veined, and 3–5 lobed or 3-foliate. The margins are doubly serrate, with sharp teeth. The petioles and young twigs are often red. The inconspicuous flowers are borne in corymbose cymes, with greenish sepals and similar-colored petals up to 5 mm long. It flowers in April–June. The paired fruits (double samaras) are glabrous and up to 2 cm long, with a round, seed-bearing portion up to 12 mm in diameter and a wing up to 3 times that in length.

Habitat and range: *Acer glabrum* is a native maple, found in pinyon-juniper, mountain brush, big sagebrush-grass, ponderosa pine,

Douglas fir, lodgepole pine, and spruce-fir communities in all Utah counties, at 1675–3175 m.

Comments: Two varieties are recognized in Utah: *Acer glabrum* var. *glabrum*, which is found in all counties of the state, and *Acer glabrum* var. *diffusum* (Greene) Smiley, which has smaller and thicker leaves and is more common in the western part of the state (Washington to Tooele counties). Rocky Mountain maple is an important pioneer plant following fires. It is also an attractive shade-tolerant landscape choice, with yellow or orange leaves in the fall. *Glabrum* means “smooth” or “without hairs,” and *diffusum* means “to spread out.”

Acer grandidentatum Nutt., Bigtooth maple



Description: Bigtooth maple is a deciduous tree, up to 8 m tall. Under good conditions, it grows as a single-stemmed handsome tree; on poorer quality sites, it forms a large shrub, with multiple stems. The bark is grayish and smooth, even on quite large trees, and ultimately becomes dark brown or black on older stems, developing longitudinal furrows. The leaves are opposite, palmately veined, 3–5 lobed, up to 13 cm in diameter, dark green above, and paler and hairy below. The margins are often almost entire, but occasionally bear a few blunt teeth. The flowers are produced in loose corymbose to subumbellate clusters, usually appearing in May. The hairy fruits are borne in pairs (double samaras), with wings up to 2 cm long.

Habitat and range: *Acer grandidentatum* is a late-successional dominant plant of mountain brush communities except Daggett, Emery, and Wayne at 1280–2810 m. and reported in nearly all Utah counties. It also grows in Idaho and Wyoming, and southward to Colorado, Arizona, Nevada, and Mexico.

Comments: Bigtooth maple is native tree with wonderful landscaping potential, but it is intolerant of saline or alkaline soils and of flooding. The

leaves turn yellow, bronze, or brilliant red in autumn. It does not resprout following fire, but it will recolonize via seed germination over time. *Grandidentatum* means “large tooth.”

***Acer negundo* L., Boxelder**



Description: Boxelder is a deciduous, dioecious tree, up to 12 m tall. It usually produces a strong single stem at ground level when growing along streams and rivers, but it assumes a shrub-like habit on drier sites. The branches are opposite. The pinnately compound leaves may be hairy, or sometimes glabrate, on 1 or both surfaces, with coarsely toothed or lobed margins, and have 7 or fewer leaflets up to 10 cm long and 2.5 cm wide. The flowers occur in long drooping clusters, up to 25 cm long, and bloom in April–May, before the leaves appear. The ovary may be hairy or glabrate, and the fruits are double samaras, with wings up to 25 mm long and 10 mm wide.

Habitat and range: Boxelder is reported in all Utah counties except Piute (and no doubt occurs here as well), at 850–2440 m. This species is widely distributed in North America, occurring in riparian or palustrine habitats from British Columbia eastward across North America and southward to Central America.

Comments: *Acer negundo* is the only North American maple with compound leaves. In spite of its weak wood and prolific seeds, it is commonly cultivated, but it can be weedy and invasive. The trees are infested by large, hemipteran, sap-feeding insects (boxelder bugs), which may also make these trees somewhat undesirable in domestic landscapes. Boxelder was tapped by early pioneers to produce maple sugar, but it is not important as a commercial foodstuff source. *Negundo* is from the Sanskrit word *nirgundi*, a native name in India for trees in the genus *Vitex*. Linnaeus possibly applied the epithet to *Acer* because of similarities in the leaves.



SARCOBATACEAE—Greasewood family

The greasewood family has only one genus, *Sarcobatus*, which has traditionally been placed within Chenopodiaceae.

Sarcobatus Nees

Sarco means “fleshy” and *batus* means “bramble.”

Sarcobatus vermiculatus (Hook.) Torr., Greasewood



Description:

Greasewood is a large shrub, growing up to 2 m tall. The plant is often very thorny, due to short shoots that tangle with the lateral branches. The leaves are fleshy, usually alternate,

but sometimes subopposite below, sessile, up to 4 cm long, subterete, linear, and glabrous or somewhat pubescent, with very short branched hairs. The male flowers appear in densely flowered axillary spikes, up to 3 cm long, and bloom in May–June. The female flowers are sessile and occur lower on the plant, in the leaf axils. All flowers bear a flattened calyx up to 8 mm in diameter. The fruits are up to 5 mm long, fusiform, and surrounded by a wing.

Habitat and range: Greasewood grows on a wide variety of alkaline, but never very salty, soils (less than 1% soluble salt), in all Utah counties except Morgan, Summit and Wasatch at 1220–2170 m. It also occurs in much of the western United States and in Sonora, Mexico.

Comments: *Sarcobatus vermiculatus* produces oxalic acid in sufficient quantities to make it poisonous to herbivores, but it does provide important cover and habitat for various species. The roots of this shrub may be more than 50 feet long. *Verm* means “worm” or “worm shaped,” referring to the shape of the leaves.



SCROPHULARIACEAE—Figwort family

The figworts are a large, diverse family, with annual and perennial herbs, shrubs, and a few trees, known mostly from temperate regions worldwide. It contains some medicinal plants, such as figworts and mullein. Some of its members, such as butterfly bush (*Buddleja*), are cultivated for ornamental use. This family includes only one species that is considered woody and native to Utah, *Buddleja utahensis*, which was previously included in the family Buddlejaceae.

***Buddleja* L.**

Buddleja is named after Reverend Adam Buddle, a mid-17th- to early 18th-century English botanist and expert on bryophytes.

***Buddleja utahensis* Coville, Utah butterfly bush**

Description: Utah butterfly bush is a small shrub that rarely grows more than 3 dm tall. It is much branched, rounded, and white or very pale colored, due to its dense covering of lanate-tomentose stellate hairs. The leaves are linear, up to 3 cm long, with revolute margins that may be entire, crenate, undulate, or serrate, and are subsessile, with fascicles of smaller leaves in the axils. The flowers are small, appear in tight glomerules arranged in interrupted spikes up to 5 cm long, and bloom in April–June. The sympetalous corollas are up to 5 mm long, forming narrow tubes that are yellowish, or sometimes purplish. The corolla lobes, about 1 mm long, are above the minutely tomentose tube. The fruits are small capsules.

Habitat and range: *Buddleja utahensis* grows in Mojave Desert shrub communities in Washington Co., on limestone outcrops in the Beaver Dam Mountains, at 800–1100 m. It is also known from Arizona, California, and Nevada.

Comments: *Utahensis* means “of Utah.”



SIMAROUBACEAE—Quassia family

Plants in the quassia family are mostly tropical or subtropical trees or shrubs. They have bitter bark and a disagreeable smell. The leaves are usually alternate and pinnately compound. The flowers are regular and usually small, with 5 distinct petals and a superior ovary. The fruit is usually a samara (although some are a drupe or a capsule). The only member of this family in Utah, *Ailanthus altissima*, was introduced but is now naturalized.

Ailanthus Desf.

Ailanthus is derived from the Moluccan word *ailanto*, meaning “sky tree.”

*Ailanthus altissima** (Mill.) Swingle, Tree-of-heaven*



Description: Tree-of-heaven is a deciduous tree, growing up to 20 m tall, often with several stems at ground level. The leaves are alternate, compound-pinnate, may be up to 6 dm long, and produce as many as 25 leaflets. The leaflets are lanceolate to elliptical, up to 15 cm long and 4.5 cm wide, and have subentire margins, with a few rounded teeth toward the base. The flowers are small, greenish to white, produced in large terminal panicles that in appear June–July, and have 5 sepals and 5 petals. The stamens number 10 in staminate flowers, or 2–3 in perfect flowers, and are malodorous. The fruit is a samara, 3–5 cm long.

Habitat and range: *Ailanthus altissima* is an escaped cultivar that has naturalized widely in Utah. It is native to China, and is spreading throughout the state of Utah below 2000 m., where it tends to become a troublesome weed.

Comments: Popularity for this ornamental waned, due to its foul odor and suckering habit. Tree-of-heaven thrives in full sun and in disturbed areas, and it resprouts readily after it is cut. It may be the fastest-growing tree in North America. It is very tolerant of pollution. In China, tree-of-heaven valued as a medicinal plant. It is also a host plant for the silkworms of the ailanthus silk moth. The wood is best known for making Chinese kitchen steamers. *Ailanthus altissima* is very difficult to eradicate, as it produces a chemical called ailanthone that inhibits the growth of other plants and allows it to outcompete them. *Altissima* means “very high” or “tallest.”



SOLANACEAE—Nightshade family

The term *solari*, meaning “to quiet or soothe,” refers to the narcotic effect of many members of this family. The nightshade family includes herbs, shrubs, trees, and vines that are well distributed throughout the world, and are most abundant in Central and South America. Woody members of this family are often thorny. The leaves are alternate, simple, or pinnately compound, without stipules. The flowers are regular, sympetalous, usually 5 merous, often showy, and are usually pollinated by insects and hummingbirds. The fruit is usually a berry or capsule. Plants in this family contain many alkaloids, which probably reduces herbivory. All members of the family should be considered poisonous, even those used as food crops. The mature fruits of tomatoes, peppers, and eggplants, and tubers of potatoes (if they are not green), may be safely eaten. Some species known for their toxicity include tobacco (*Nicotiana*), jimson weed (*Datura*), and nightshades (*Solanum*). *Atropa* produces a chemical that dilates the pupil of the eye. Some plants (*Petunia*) are used as ornamentals. In Utah, there are six species that are considered woody.

Lycium L.

Lycium is Greek for “thorny bush.”

Lycium andersonii A. Gray, Anderson’s lycium



Description: Anderson’s lycium is a medium-sized shrub, growing up to 2 m tall. It has alternate fascicled leaves that are simple, spatulate, and thickened. A slender, needle-like thorn is borne in the leaf axil. The leaves are up to 15 mm long and glabrous to sparsely pubescent. The flowers are whitish to lavender, occurring singly or in pairs in the leaf axils. The flowers are tubular to funnelform, 10–16 mm long, with short lobes (up to 2.5 mm long) that flare out from the tube, and open

in March–May. The stamens are 4 or 5 in number and are exerted 2 or 3 mm beyond the throat of the flower. The fruit is a succulent, ellipsoidal or round red berry, 4 or 5 mm long.

Habitat and range: Anderson's lycium grows in Mojave Desert shrub, sagebrush, or pinyon-juniper communities in southern and western Utah, and as far north as Tooele Co., at 730–2130 m. It also occurs in Arizona, California, Nevada, New Mexico, and Mexico.

Comments: Though small, the red fruits of *Lycium andersonii* are edible and quite sweet, and they are eaten by kangaroo rats and quail, as well as other birds. *Andersonii* honors Charles Lewis Anderson, a 19th-century physician and naturalist.

*Lycium barbarum** L., Matrimony vine*



Description: Matrimony vine is a medium-sized shrub, with arching or clambering branches that may grow to 4.5 m long. The dull-lilac-colored flowers are rotate or campanulate, up to 7 mm long, and appear in March–October. The 4 or 5 stamens are borne in the throat of the flower, but they are only slightly exerted. The red to deep red fruit is an ovoid berry, sometimes 10–15 mm in diameter.

Habitat and range: Matrimony vine occurs in cultivated areas throughout Utah, at 930–2130 m.

Comments: *Lycium barbarum* is a European introduction, and it was initially widely planted around homes and in cemeteries by pioneers. It has persisted at many locations and has become an undesirable weed. *Barbarum* means “strange” or “foreign.”

Lycium cooperi A. Gray, Cooper's lycium

Description: Cooper's lycium is a dense thorny shrub, growing up to 2 m tall. The leaves are oblanceolate to spatulate, 1–3 cm long and 5–10 mm wide, with entire margins, and glabrous to glandular. The flowers are borne in the leaf axils, droop on pedicels 8–15 mm long, and bloom in March–May. The greenish-white corollas are funnelform, up to 12 mm long and almost as wide. The stamens extend to the mouth of the corolla. The ovoid fruit is 6–10 mm long, constricted midway along its length, bears several seeds, and ripens as a rather dry capsule.

Habitat and range: Cooper's lycium is found in Mojave Desert shrub communities, commonly growing with desert willow and catclaw acacia, in Washington Co., at 760–1065 m. It also occurs in Arizona, California, Nevada, and Mexico.

Comments: *Lycium cooperi* is well adapted to hot desert environments. Birds and small mammals eat the berries. *Cooperi* is named after James Graham Cooper, a 18th-century surgeon, ornithologist, and naturalist for the California Geological Survey.

Lycium pallidum Miers, Pale wolfberry

Description: Pale wolfberry is an erect shrub, growing up to 2 m tall. The leaves are alternate, fascicled, spatulate to elliptic, and up to 4 cm long. The leaf surfaces are glabrous and glaucous. Slender spines occur in the leaf axils. The flowers are greenish to yellowish and purple tinged, with narrowly funnelform corolla tubes up to 2 cm long, and bloom in March–May. The stamens are usually slightly exerted. The fruits are ovoid berries, about 1 cm in diameter, and red to reddish blue at maturity.

Habitat and range: Pale wolfberry grows in Colorado Plateau shrub, sagebrush, mountainbrush, and pinyon-juniper communities, at



1000–1870 m, in Garfield, Iron, Kane, San Juan, and Washington cos. It also grows in Arizona, Colorado, New Mexico, Texas, and Mexico.

Comments: *Lycium pallidum* commonly occurs around the stone ruins of ancient peoples. It had some medicinal and ceremonial use to Native Americans. *Pallidum* means “pale.”

Lycium torreyi A. Gray, Torrey's lycium



Description: Torrey's lycium is a much-branched spreading shrub, growing up to 3 m tall. The leaves are subglabrate, broadly spatulate, 1–5 cm long and 3–10 mm wide, and bear sturdy spines in the leaf axils. The corollas are borne in fascicles, arising from the leaf axils. The tubular blossoms are lavender purple, up to 15 mm long, and bloom in March–May. The stamens are about equal in length to the corolla tube. The fruits are many-seeded berries, up to 10 mm in diameter, succulent, round, and red.

Habitat and range: Torrey's lycium grows in *Tamarix* and *Baccharis*

thickets along streams in Mojave Desert shrub and salt desert shrub communities, as well as along valley bottoms, in Garfield, Grand, Washington, and Wayne cos., at 760–1160 m. It also occurs in Arizona, California, Nevada, New Mexico, Texas, and Mexico.

Comments: *Lycium torreyi* is drought deciduous and grows in hot, sunny, alkaline soils. *Torreyi* honors John Torrey, a 19th-century American botanist and teacher of Asa Gray.

***Solanum* L.**

Solanum means “to comfort or soothe.”

Solanum dulcamara** L., European bittersweet



Description: European bittersweet displays arching, clambering stems up to 3 m long. The leaves are glabrate, ovate, and up to 12 cm long, with acuminate tips. The bases may be auriculate or hastate. The petioles are 1–4 cm long. The flowers, appearing in May–September, are purplish and borne in many-flowered cymes, on pedicels up to 1 cm long. The corollas may be up to 16 mm long and almost as wide, deeply cleft into 5 lobes. The anthers are about 5 mm long, fused into a graceful arch over the pistil. The berries are ellipsoidal, up to 12 mm in diameter, and red at maturity.

Habitat and range: *Solanum dulcamara* is an introduced species of European origin. It commonly occurs in irrigated areas, along canal banks and ditches, and on other moist sites. It has been collected in north and central Utah, at 1220–2190 m, and grows throughout North America.

Comments: *Solanum dulcamara* contains the chemical solanine, which is poisonous to humans and livestock, as well as the glycoside dulcamarin, which is responsible for its bittersweet taste. The fruits of European bittersweet are attractive, but their taste is extremely bitter. Birds eat and disperse the seeds. *Dulcamara* is Latin for “bittersweet.”

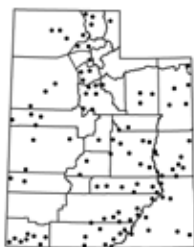
TAMARICACEAE—Tamarisk family

The tamarisk family consists of subshrubs, shrubs, and trees in temperate to arid desert regions of Asia, Europe, and Africa, where these plants are adapted to saline and alkaline soils. Most have salt-secreting glands, to rid the tissues of salts. The leaves are alternate, scale-like, without stipules, and usually sessile. The flowers are small, 4–5 merous, and regular. The fruits are capsules. In Utah, one introduced woody species has naturalized and become weedy.

Tamarix L.

Tamarix is named after the Tameris River in Spain.

*Tamarix chinensis** Lour., Tamarisk*



Description: Tamarisk grows as a deciduous shrub or small tree, up to 6 m tall, along well-watered sites. The bark is dark reddish brown, becoming gray with age. The tiny leaves are alternate, sessile, scale-like, and overlapping. The pinkish flowers, produced in attractive dense masses that bloom in March–October, are mostly perfect and complete, and have very small petals up to 2 mm long. The mature fruits are one-chambered capsules. The seeds have a tuft of small hairs and are widely dispersed by wind.

Habitat and range: Tamarisk was introduced from Africa and the Middle East, and it is now widely naturalized throughout the southern United States. In Utah it has been collected in all counties except Iron, Morgan, Piute, Summit, and probably occurs in these as well. It is well adapted for saline soils.

Comments: *Tamarix chinensis* was initially introduced as an ornamental, and then used to stabilize eroded streambanks and provide food and cover for wildlife in areas where overgrazing had removed native species. It is now considered a noxious weed. Tamarisk produces deep roots that

dry up springs and waterways, altering natural ecosystems and threatening fragile desert systems. It lacks natural predators and produces great quantities of seeds. Dam building alters natural flooding, which benefits tamarisk over native vegetation. Overgrazing by cattle removes the more palatable cottonwood and willow species, giving tamarisk another competitive advantage. Restoration of riparian ecosystems may be possible through extensive programs of tamarisk removal, discontinuation of overgrazing on riparian areas, appropriate use of effective biological control agents, and the replanting and reseedling of native species. *Chinensis* means “of China.”



ULMACEAE—Elm family

Members of the elm family are primarily trees and shrubs, with watery to mucilaginous sap in their bark and leaf tissue. They are distributed mainly in temperate and tropical regions of the Northern Hemisphere. The pith is finely chambered at the nodes. The leaves are alternate and simple, with an asymmetrical base, have entire to toothed margins, and produce stipules. The flowers are small, inconspicuous, and regular, with a superior ovary. Wind and insects pollinate the flowers. The fruits are samaras, drupes, or nutlets. Many species of *Ulmus* (elm) are used for fine timber, because of their distinctive grain and insect resistance. The bark of *Ulmus rubra* (slippery elm) is used as a medicine. Several members of this family are important as ornamentals. In Utah, Ulmaceae is represented by only one species, which is not native but has now become naturalized throughout the state. (See the family Cannabaceae for *Celtis*)

Ulmus L.

Ulmus is Latin for “elm.”

*Ulmus pumila** L., Siberian elm*



Description: Siberian elm is a large tree, growing up to 25 m on favorable sites. The leaves are elliptic to lance-ovate, up to 7.5 cm long, with slightly oblique bases, once serrate, strongly 2-ranked, dark green and polished on the upper surface, and some-

what paler and glabrate below. The apetalous flowers, blooming in April–May, are greenish, small, and borne in clusters in the leaf axils. Each flower produces 8 stamens and a single pistil. The samara is roughly orbicular, with a translucent wing around its periphery, and may be as much as 13 mm in diameter.

Habitat and range: *Ulmus pumila*, native to Asia, is an established member of the flora in almost every Utah county, at 850–2320 m. It is a very successful invader

of irrigated places in our valleys and any better-watered sites in our foothills.

Comments: Siberian elm does well because it grows rapidly and is tolerant of sun, drought, and cold temperatures. Following the Dust Bowl of the 20th century, it was used extensively to stabilize soils. It does not make a desirable ornamental, because it is short lived, highly susceptible to insects and parasites, and is not particularly attractive. *Ulmus pumila* is very invasive and has become problematic in cities and open areas. This weedy species is not to be confused with the ornamental *Ulmus parvifolia* (Chinese elm), which is more resistant to insects and less invasive. *Pumila* means “small” or “a pygmy form.”



VERBENACEAE—Verbena family

The verbena family consists of plants that are aromatic herbs and shrubs in tropical and subtropical regions, with a few members occurring in temperate areas. The stems are often square in cross section and bear leaves that are mostly simple, opposite (or sometimes whorled), and lack stipules. The inflorescences are indeterminate spikes, clusters, or racemes, producing bilateral showy flowers that are pollinated by insects (commonly butterflies). The ovary is superior, with styles arising from the apex. The fruits are drupes, capsules, or nutlets. The tissues may contain essential oils (iridoid compounds). Verbenaceae is closely aligned with the family Lamiaceae. Some members of Verbenaceae are used for their oils, and many are used for herbal remedies. Teak (*Tectona grandis*) is an important lumber tree from Southeast Asia. *Lantana* and vervain (*Verbena*) are common ornamentals. Utah has only one species native and woody species, *Aloysia wrightii*.

Aloysia Palau

Aloysia is named after Maria Louisa, Princess of Parma in the 18th century and wife of King Carlos IV of Spain.

Aloysia wrightii A. Heller, *Aloysia*



Description: *Aloysia* is a medium-sized shrub, up to 1.5 m tall. The bark peels easily, in long strips, and the wood is yellow. The leaves are opposite, deciduous, simple, ovate to round, up to 1.7 cm long, with crenate to serrulate margins and resinous glands, strigose and crinkled above, densely hairy below, deeply veined, and smell like oregano when crushed. The small white flowers, up to 2.5 mm long, appear in September–October and are borne in leafy panicles. The calyx is tubular, campanulate, covered with spreading hairs, and has 4 terminal lobes. The fruit is a small dry schizocarp.

Habitat and range: *Aloysia* occupies rocky, cliffy sites, derived from limestone, in the Beaver Dam Mountains in Washington Co., at 1050–1250 m. It also occurs in Arizona, Nevada, New Mexico, Texas, and Mexico.

Comments: *Aloysia wrightii* is a very late-flowering species in arid environments, possibly responding to the late summer rains. The flowers are attractive to bees, butterflies, and birds. It is drought tolerant and sometimes used in xeric landscaping. *Wrightii* honors Charles (Carlos) Wright, a 19th-century American botanist and plant collector.



VITACEAE—Grape family

Members of the grape family are primarily climbing woody vines, with tendrils and opposite leaves. The nodes are often swollen. Some species are succulent. Most are tropical and subtropical, with relatively few species native to temperate climates. The leaves are simple to compound, often palmately veined or lobed. The flowers are small, regular, 4–5 merous, and greenish. Insects and wind pollinate the flowers. The ovary is superior and develops into a berry. The fruit of *Vitis vinifera*, of Eurasian origin, is used for grapes, wine, and raisins. The fruits of other species are used for wine, jam, and grape juice. Some are used as medicines. In Utah, we have two native woody species, *Vitis arizonica* and *Parthenocissus vitacea*, and one nonnative naturalized species, *Parthenocissus quinquefolia*.

***Parthenocissus* Planch.**

Partheno is Greek for “virgin,” maidenly,” or “pure,” and *cissus* is derived from *kisso*, meaning “ivy.”

Parthenocissus quinquefolia** (L.) Planch., Virginia creeper



Description: Virginia creeper is a trailing vine that may grow up to 5 m long. The tendrils produce 3–8 branches that twine around any structure and anchor themselves by the adhesive disks terminating the branches. The leaves are compound palmate and may be up to 25 cm wide, with 3–7 leaflets. The leaflets are petioled, elliptical, with strongly serrated margins, pale green and dull above, and glaucous below. The flowers are small, borne in clusters along the axis, and appear in June–July. The fruit is a thin-fleshed berry, 5–7 mm in diameter, and bluish at maturity.

Habitat and range: Virginia creeper is native to the eastern United States, and it is now established in Daggett, Salt Lake, Uintah, Utah, and Washington cos, at 1340–1740 m. It grows along watercourses and in other moist areas.

Comments: *Parthenocissus quinquefolia* is a beautiful plant in autumn, but it is not recommended as an ornamental, because it can be invasive, strangling native and other ornamental plants, and is very hard to remove once established. The berries are toxic to humans, and the vegetation may cause skin irritation, similar to poison ivy, that may last for weeks. Virginia creeper provides food and cover for birds, mainly songbirds. *Quinquefolia* refers to the 5 leaflets.

***Parthenocissus vitacea* (Knerr) Hitchc., Thicket creeper**



Description: Thicket creeper is a trailing vine, with palmately compound leaves up to 25 cm wide. The leaflets have short petioles and are ovate to oblanceolate, coarsely serrate, lustrous green above, and slightly glaucous below. The inflorescence is dichotomously branched. The flowers, appearing in May–July, are usually complete and perfect, and some are unisexual. The berries are up to 10 mm in diameter.

Habitat and range: Thicket creeper is a native vine, confined to riparian woodlands and moist openings along the Colorado River in Garfield, Kane, and San Juan cos. in eastern Utah, at 1130–1375 m. It also occurs in much of North America.

Comments: The berries of *Parthenocissus vitacea* contain oxalic acid, which is somewhat poisonous to humans and other mammals. It provides winter food for birds. The foliage is colorful in the fall. *Vitacea* means “grape-like.”

***Vitis* L.**

Vitis is Latin for “grapevine.”

***Vitis arizonica* Engelm., Canyon grape**



Description: Canyon grape is a vigorous vine, growing up to 6 m long and supported on trees by twining tendrils. The leaves are simple, cordate

ovate, up to 12 cm long and 14 cm wide, and weakly tomentose, or glabrate. The panicles are up to 10 cm long. Fragrant white flowers appear in May–June. The fruit is a large berry, up to 10 mm in diameter, succulent, bluish, and somewhat bitter.

Habitat and range: Canyon grape is a native vine, common along watercourses in Washington Co., at 830–1830 m. It also grows in Arizona, Nevada, New Mexico, Texas, and Mexico.

Comments: The berries of *Vitis arizonica* provide valuable food and cover for birds and other wildlife. The fruits are also edible to humans, and are used in jelly, wine, and juice. Canyon grape was cultivated by the Pueblo Indians. It is used for erosion control and as an ornamental. The leaves turn yellow in autumn and are very obvious in Zion Canyon. *Arizonica* means “of Arizona.”



ZYGOPHYLLACEAE—Caltrop family

Members of the caltrop family are herbs, shrubs, and occasionally trees, usually in arid or saline habitats. They occupy tropical, subtropical, and some temperate regions and are especially abundant in the Mediterranean area. The stems usually have swollen nodes and produce small, entire, usually opposite leaves. The leaves are simple or compound, often resinous, leathery or fleshy, or modified as spines. The flowers are usually regular, 5 merous, and showy, with a conspicuous nectariferous disk. They are mostly insect pollinated. The ovary is superior, and the fruit is usually a capsule or a schizocarp. The wood of *Guaiaacum officinale* (lignum vitae), from Central America, may be one of the hardest woods in the world, and it will sink when placed in water. Lignum vitae is grown commercially for timber and is used for bowling balls and mallets. Members of the genus *Guaiaacum* are also used for medicines, stains, and chemical indicators. Several other taxa in the caltrop family are weedy and poisonous. *Tribulus terrestris* (puncture vine) has hard spiny fruits that readily disperse and puncture bicycle tires. In Utah, one woody native, *Larrea tridentata* (creosote bush), may be one of the longest-living plants in the world. *Zygo* means “yolked” or “paired,” referring to the leaves.

Larrea Cav.

Larrea is named after Bishop Juan Antonio Hernández Pérez de Larrea, an 18th-century Spanish clergyman and patron of the sciences.

Larrea tridentata (Sessé & Moc. ex DC.) Coville, Creosote bush



Description: Creosote bush is an aromatic evergreen shrub that grows to 3 m tall. The leaves are resinous, opposite, and consist of 2 spreading

asymmetrical leaflets that may grow up to 10 mm long. The flowers, borne singly, are up to 12 mm long, yellow, and showy, blooming in April–May, or whenever water is available. The fruit is a 5-carpellate globose capsule, about 5 mm long, producing long white to tawny hairs, and is indehiscent at maturity.

Habitat and range: Creosote bush is the dominant shrub of the Mojave Desert. It is confined to deserts that experience only brief periods of freezing temperature. In Utah it is known from Washington Co., at 670–1130 m. It also occurs in Arizona, California, Nevada, Texas, and Mexico.

Comments: *Larrea tridentata* may be one of the oldest organisms known. As the old stems die, new stems are produced around the perimeter, forming rings or clones that may live up to 10,000 years or more. Creosote bush is unpalatable, and it is toxic to most animals. It provides shelter and food for the desert iguana, which eats the yellow blossoms. It also provides burrowing sites for the kangaroo rat. The leaves have been used as a medicinal tea by Native Americans. It is extremely drought resistant. Plant size and spacing between the plants varies with the amount of rainfall. A chemical secreted by the roots of *Larrea tridentata* prevents the growth of roots in neighboring plants. The lac-scale insect causes the common sticky black bands on the stems. The plants are very attractive when flowering, and creosote bush should be better utilized in native landscapes. *Tridentata* means “3-toothed.”



Glossary

- abaxial:** the side away from the axis; the lower surface of a leaf
- acaulescent:** the plant appearing stemless; leaves usually basal; may have a flowering stalk but lacks an above-ground stem
- achene:** a small dry fruit enclosing a single seed
- acicular:** shaped like a needle
- acorn:** a hard, dry, indehiscent fruit; often with a cup-like base; typical of oaks
- acuminate:** gradually tapering to a pointed tip, with the margins somewhat concave toward the apex (see Leaf Tips & Bases illustration)
- acute:** tapering to a pointed tip with more or less straight sides; the tip usually less than a 90° angle (see Leaf Tips & Bases illustration)
- adaxial:** the side toward the axis; the upper surface of a leaf
- adnate:** a fusion of unlike parts
- alkaline soils:** soils containing excessive amounts of adsorbed sodium; may or may not contain excess soluble salts
- alternate:** one leaf or bud arising per node (see Leaf Arrangement & Types illustration)
- angiosperm:** flowering plants with seeds produced in a fruit
- annulate:** having horizontal, sometimes projecting, ring-like bands
- apex:** the point farthest from the point of attachment, as in the tip of a leaf
- apically:** on or toward the apex or tip
- apiculate:** ending in an abrupt slender tip, not stiff (see mucronate)
- appressed:** lying flat or close against the surface of a leaf or stem
- arachnoid:** having soft entangled hairs; cobwebby
- areole:** sharply defined area bearing spines and sometimes glochids
- attenuate:** gradually drawn out or tapering
- axil:** the angle between the stem and the leaf; between an axis and a structure arising from it
- axillary:** occurring in an axil
- awl-like:** narrowly triangular, gradually tapering from the base to a sharp point (see Leaf Arrangement & Types illustration)
- awn:** narrow, bristle-like appendage
- basal:** arising from the base of the plant (see Leaf Arrangement & Types illustration)
- belled:** flared toward the tip in some leaves, resembling a bell
- berry:** a fleshy fruit with many seeds
- bipinnate:** twice pinnate; leaflets divided into leaflets
- blade:** the flat, expanded part of a leaf (see Leaf Arrangement & Types illustration)
- bloom:** a whitish waxy or powdery coating; also, refers to a flower or a period of flowering

- bract or bracteole:** a leaf-like structure, usually subtending a flower or a cluster of flowers
- caespitose:** growing in dense tufts
- calcareous:** containing calcium or calcium carbonate
- calyx:** the outermost whorl of flower parts (sepals collectively); usually green, or may be the same color as the petals (see Flower Structure illustration)
- campanulate:** bell-shaped
- canescent:** gray or white in color, due to a covering of fine, short hair
- capitate:** a globular or dense, head-shaped cluster (see Inflorescence Types illustration)
- capsule:** a dry fruit with more than one carpel that opens to release the seeds
- catkin:** a small spike or spike-like flower cluster, often flexuous or pendulous (see Inflorescence Types illustration)
- caudex:** the often-woody base of an herbaceous perennial plant
- caulescent:** a plant with leafy stems arising above the ground
- cauline:** on or pertaining to the stem
- central spine:** one of the spines in the central part of the areole of a cactus; not always obvious
- channeled:** having one or more deep, longitudinal grooves
- ciliate:** having a fringe of hairs along the margin (see Leaf Margins illustration)
- clavate:** club-shaped, elongated joint, with its diameter increasing toward the distal end
- clonal:** plants that reproduce asexually by the vegetative parts of the plant (stems, roots, leaves)
- compound leaf:** a leaf blade completely divided into two or more individual leaflets (see Leaf Arrangement & Types illustration)
- concavo-convex:** with the leaves concave on one side and convex on the other (see Leaf Shapes illustration)
- conifer:** cone-bearing plant
- cordate:** heart-shaped, with a point at the apex (see Leaf Tips & Bases illustration)
- coriaceous:** leathery
- corolla:** a collective term for a whorl of flower petals, often colorful (see Flower Structure illustration)
- corymb:** a more or less flat-topped inflorescence, with the outer flowers opening first (see Inflorescence Types illustration)
- corymbose:** arranged in a corymb
- crenate:** having rounded teeth along the margins of the leaf (see Leaf Margins illustration)
- crenulate:** having very small, rounded teeth along the leaf margin; minutely crenate (see Leaf Margins illustration)
- crisp:** curled, wavy, or crinkled
- cuneate:** a wedge-shaped or narrowly triangular base of a leaf (see Leaf Tips & Bases illustration)
- cuspidate:** tipped with a short, firm, sharp, abrupt point (see Leaf Tips & Bases illustration)

- cyme, cymose:** a rounded or flat-topped flower cluster (inflorescence); where the terminal or central flower blooms first (see Inflorescence Types illustration)
- deciduous:** with the leaves remain for just one season; plant without leaves during the winter
- decumbent:** the stems reclining on the ground, with the tips often ascending
- deflexed:** turned abruptly downward
- dehiscent:** readily opening at maturity to release its contents
- deltoid:** triangular in shape; attached at the center of one side (see Leaf Shapes illustration)
- dentate:** a toothed margin with the teeth directed outward (see Leaf Margins illustration)
- depressed:** flattened down from above
- dicot, dicotyledon:** flowering plants having seeds with two cotyledons (embryonic seed leaves); these plants typically have netted veined leaves and flower parts in fours or fives or multiples thereof
- dichotomous:** repeatedly forked in pairs
- dioecious:** the male and female flowers or cones borne on separate plants
- disk flowers:** flowers in the center of the flower head, as in members of the sunflower family (see Sunflower illustration)
- discoid:** flowering heads of the sunflower family having only disk flowers; lacking ray flowers
- distal:** opposite to the attachment end; the top of a plant or the tip of a leaf or stem (see proximal)
- doubly serrate:** with the teeth of a serrate leaf are being serrate (see Leaf Margins illustration)
- drupe:** a fleshy fruit, usually with a single seed surrounded by a stony “pit”
- elliptic:** widest in the center, with the two ends equal; more than twice as long as broad (see Flower Shapes illustration)
- emarginate:** having a notch at the tip (see retuse) (see Leaf Tips & Bases illustration)
- endemic:** confined to a limited geographical area
- entire:** having a plain or smooth margin on the leaf blade, not toothed or incised (see Leaf Margins illustrations)
- ephemeral:** lasting only a short time
- even-pinnate:** pinnately compound, with an even number of leaflets; the terminal leaflet is paired (see Leaf Arrangement & Types illustration)
- evergreen:** with the leaves persisting for more than one year, so the plants remain green throughout the winter
- falcate:** sickle-shaped
- fascicle, fasciculate:** usually referring to close clusters or bundles of leaves or needles
- female cone, seed cone, pistillate cone:** cones with just the female reproductive structures; the location of fertilization and seed production
- fastigiate:** clustered parallel to each other, giving a broom-like shape
- filiform:** thread-like, usually referring to the leaf
- floccose:** with tufts of soft, woolly hair
- follicle:** a dry fruit with one carpel, splitting only down one side to release its seeds

- funnelform:** gradually widening from the base to the apex; a funnel-shaped flower
- glabrate:** becoming glabrous with age
- glabrous, glabrescent:** having a surface not covered with hairs
- glandular punctuate, punctuate glandular:** dotted with pits or glands
- glandular stipitate, stipitate glandular:** having glands on a slender, stalk-like base
- glaucous:** covered with a whitish or bluish waxy covering, usually easily rubbed off
- glochid:** a fine, barbed bristle, much smaller than a spine, produced in the areoles of members of the genus *Opuntia* (chollas and prickly pears)
- globose:** globe-like
- glutinous:** covered with a sticky, gummy substance
- gymnosperm:** a plant with seeds usually borne in cones; not having flowers or fruits
- gypsum, gypsiferous soils:** substrates containing gypsum (calcium sulfate)
- hastate:** shaped like an arrowhead, with the lobes turned outward (see Leaf Tips & Bases illustration)
- herbaceous:** not woody; lacking woody tissue
- herbage:** the non-woody stems and leaves of a plant
- hirsute:** having coarse, stiff hairs
- hirtellous:** pubescent, with small, coarse, stiff hairs
- hispid:** rough, with stiff or bristly hairs
- hispidulous:** minutely hispid
- hypanthium:** an enlargement of the receptacle of the flower, which may partially or completely surround or enclose the pistil; usually cup-shaped
- igneous:** formed by the solidification of molten rock
- indehiscent:** not readily opening at maturity to release its contents
- inflorescence:** a cluster of flowers on a plant
- internode:** the portion of the stem between two nodes (see Twig Structure illustration)
- involucre:** a whorl of bracts subtending a flower or flower cluster (see Sunflower illustration)
- involucral bract:** one of a whorl of bracts subtending a flower or flower cluster (see Sunflower illustration)
- involute:** with the leaf margins rolled inward toward the upper side (see Leaf Margins illustration)
- joint:** a section or segment of a jointed stem, as in some cacti
- keel:** a prominent ridge, analogous to a keel on a boat
- lanceolate:** lance-shaped; several times longer than wide; broadest toward the base and tapering toward the apex (see Leaf Shapes illustration)
- lateral:** borne on the sides of a structure
- layering:** developing roots where a stem comes in contact with the ground or where transported soil is deposited around the stem
- leaf scar:** the scar remaining on a twig after the leaf falls
- leaflet:** a leaf-like segment of a compound leaf
- legume:** a dry, pod-like fruit with one carpel, releasing seeds along two seams; typical of the pea family

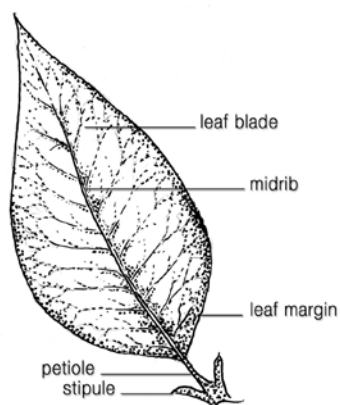
- lenticel:** a more or less lens-shaped area on the bark of new stems; usually slightly raised and somewhat corky (see Twig Structure illustration)
- linear:** long, narrow, and flat, with parallel sides (see Leaf Shapes illustrations)
- lobe:** a segment or extension of a plant part, as on a leaf blade (see leaf type diagram)
- male cones, staminate cones, or pollen cones:** cones with just the male reproductive structures; pollen-producing
- margin:** the edge of a leaf blade (see Leaf Structure illustration)
- mesic, mesophytic:** substrates with moderate amounts of moisture or plants requiring moderate amounts of moisture, as distinguished from xerophytic or hydrophytic
- midrib:** the central vein of a leaf (see Leaf Structure illustration)
- monocots:** plants with a single embryonic seed leaf; these plants typically have leaves with parallel veins and flower parts in threes or multiples of three
- monoecious:** the male and female flowers or cones borne on the same plant
- mucronate:** having an abrupt, small, tooth-like tip at the apex of a leaf (see Leaf Tips & Bases illustration)
- nerve:** a prominent, simple vein or rib of a leaf or other structure
- netted veins:** a reticulate vein pattern, as in a fishnet; the veins may be pinnate or palmate, but not parallel
- node:** the area of the stem where the buds arise (see Twig Structure illustration)
- obcordate:** heart-shaped, with a stalk at the pointed end (see Leaf Shapes illustration)
- oblanceolate:** inversely lanceolate, attached at the narrow end (see Leaf Shape illustration)
- oblique:** having a leaf base with unequal sides (see Leaf Tips & Bases illustration)
- oblong:** two to four times longer than wide, with parallel sides; broadly linear (see Leaf Shapes illustration)
- obovate:** inversely ovate, attached at the narrow end (see Leaf Shape illustrations)
- obtuse:** blunt or rounded at the tip, with an angle of less than 90° (see Leaf Tips & Bases illustration)
- odd-pinnate:** pinnately compound, with an odd number of leaflets; the terminal leaflet is not paired (see Leaf Arrangement & Types illustration)
- opposite:** two leaves or buds arising from the same node, one across from the other (see Leaf Arrangement illustration)
- orbicular:** round and flat (see Leaf Shapes illustration)
- oval:** broadly elliptic, the width over half the length (see Leaf Shapes illustration)
- ovary inferior:** the flower parts appear to arise above the ovary of the flower
- ovary superior:** the flower parts appear to arise below the ovary of the flower
- ovate:** egg-shaped in outline and attached at the wide end (see Leaf Shapes illustration)

- palmate:** a palm-like pattern of leaf veins or leaf lobes; the arrangement of the leaflets of a compound leaf (see Leaf Arrangement & Types illustration)
- palmatifid:** palmately cleft or lobed
- panicle, paniculate:** a compound, branched, raceme-like inflorescence, with the flowers maturing from the bottom upward (see Inflorescence Type illustration)
- pannose:** felt-like; covered with closely interwoven hairs
- papillate:** with structures bearing low, rounded, or nipple-shaped projections
- pappus:** a whorl of bristles, scales, or hairs located just outside of the petals in members of the sunflower family; modified sepals (see Sunflower illustration)
- parallel veins:** the main veins of the leaf, running parallel to each other and to the leaf axis
- pedicel:** the stalk of a single flower in an inflorescence (see Flower Structure illustration)
- peduncle:** the stalk of a flower cluster or of a solitary flower
- peltate:** shield-like
- pendent, pendulous:** hanging or drooping
- perfect:** bisexual; having both stamens and pistils in the same flower
- perianth:** the floral envelope, consisting of petals and sepals
- persistent:** not readily dropping; remaining attached after similar parts have dropped off or after its function is complete
- petal:** a leaf-like segment of the corolla, often colorful (see Flower Structure illustration)
- petaloid:** resembling a petal
- petiolate:** having a petiole
- petiole:** a stalk that holds a leaf (see Leaf Structure illustration)
- pilose:** having long, soft hairs
- pinnate:** a feather-like pattern of leaf veins or leaf lobes; the arrangement of leaflets on a compound leaf (see Leaf Arrangement & Types illustration)
- pinnatifid:** pinnately cleft or lobed half the distance or more to the midrib, but not reaching the midrib of the leaf
- pinnatisect:** pinnately cleft to the midrib of the leaf
- pistil:** the female reproductive structure of a flower; the centermost structure of the flower (see Flower Structure illustration)
- pistillate:** having a flower or cone bearing only the female reproductive structures
- pith:** the spongy tissue in the center of a stem (see Twig Structure illustration)
- plane:** with a flat surface
- plano-convex:** with the leaves flat on one side and convex on the other (see Leaf Shapes illustration)
- plumose:** with hairs or fine bristles along both sides of a main axis
- pome:** a fleshy fruit with many seeds, like an apple
- prickle:** a small, sharp outgrowth of the epidermis or bark
- procumbent:** with the stems trailing on the ground but not rooting

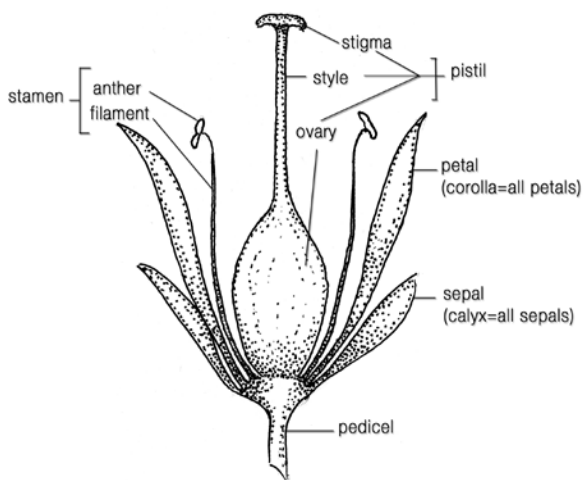
- prostrate:** lying flat on the ground
- proximal:** toward the base or point of attachment (see distal)
- pruinose:** a waxy, powdery coating (glaucous)
- puberulent:** minutely pubescent
- pubescent:** covered with hairs; usually referring to short, soft hairs
- pulvinate:** cushion- or mat-like
- punctate glandular, glandular punctuate:** dotted with pits or glands
- pungent:** tipped with a sharp, rigid point
- pustulose:** having small blisters or pustules, often at the base of a hair
- pyriform:** pear-shaped
- raceme, racemose:** an inflorescence bearing pedicelled flowers along an axis, with the younger flowers nearer the apex (see Inflorescence Type illustration)
- radial spine:** one of the spines on the margin of the areole of a cactus; not always obvious
- radiate flower head:** a flowering head containing at least some ray flowers (see discoid)
- ray flowers:** strap-shaped flowers in members of the sunflower family (see Sunflower illustration)
- recurved:** curved backwards
- reflexed:** bent backward or downward
- reniform:** kidney-shaped; usually attached at the center of an incurved side (see Leaf Shapes illustration)
- resinous:** bearing resin and often sticky
- reticulate:** having a fishnet pattern
- retorse:** directed downward or backward
- retuse:** shallowly notched at a rounded apex (see emarginate)
- revolute:** with the leaf margins rolled inward toward the lower side (see Leaf Margins illustration)
- rhizome:** a prostrate stem growing below or partially below the surface of the ground
- rhombic:** diamond-shaped (see Leaf Shape illustration)
- rib:** a vertical or spiral ridge along the side of cactus stem, formed by the coalescence of the tubercles; a main longitudinal vein that may be raised above the surface of the leaf, such as a midrib
- riparian:** growing along the banks of streams, springs, or seeps
- rosette:** a cluster of leaves in a circular pattern
- saline:** salty; containing excessive amounts of soluble salts
- samara:** a dry-winged fruit
- scaberulose:** minutely scabrous, or slightly rough to the touch
- scabrous:** rough to the touch, due to the structure of the epidermal cells or the presence of short, stiff hairs
- scale-like:** with a thin, flat, overlapping structure, as in junipers (see Leaf Arrangement & Types illustration)
- scurfy:** covered with small, bran-like scales
- sepal:** a segment of the calyx (see Flower Structure illustration)
- sepaloid:** sepal-like in color and texture
- sericeous:** covered with long, straight, soft, appressed hairs; having a silky appearance

- serrate:** having a saw-tooth margin (see Leaf Margins illustration)
- serrulate:** minutely saw-toothed (see Leaf Margins illustration)
- sessile:** without a stalk
- shale:** a sedimentary rock composed of fine particles formed from clay or silt-like mud
- sheath:** a paper-like envelope that may surround the base of a plant part, such as a leaf
- simple leaf:** with the blade not divided into separate leaflets; may be deeply lobed
- simple stem or hair:** not branched
- sinus:** the cleft or indentation between two leaf lobes
- spatulate:** broad and rounded at the apex, tapering to the base (see Leaf Shapes illustration)
- spike, spicate:** an inflorescence where the flower clusters are sessile and arranged along an axis (see Inflorescence Types illustration)
- spine:** a rigid, sharp-pointed outgrowth of the stem, without conducting tissue; a modified leaf or stipule
- spinescent, spinose:** bearing a spine or a spine-like point at the tip
- spinulose:** minutely spiny
- spur branches:** short side branches with short internodes, so the leaves appear clustered or fascicled
- stamen:** the male reproductive structure of a flower (see Flower Structure illustration)
- staminate:** having a flower or cone bearing only the male reproductive structures
- staminode:** a modified sterile stamen, producing no pollen
- stellate:** star-shaped
- striate:** with fine, longitudinal, parallel lines or ridges
- stipitate glandular, glandular stipitate:** having glands on a slender, stalk-like base
- stipules:** leaf-like appendages located at the base of the leaf stalk; may be modified as thorns (see Leaf Structure illustration)
- stoloniferous:** bearing stolons, that is, long, creeping or horizontal, above-ground stems that give rise to roots or new plants at the nodes or tips
- strigillose:** minutely strigose
- strigose:** having straight, stiff, sharp, appressed hairs
- style:** the part of the pistil between the stigma and the ovary (see Flower Structure illustration)
- subshrub:** a perennial plant, woody only at the base or slightly above (see suffrutescent)
- subtended:** located closely beneath something
- succulent:** juicy or fleshy
- suffrutescent:** having a stem that is woody only at the base or slightly above (see subshrub)
- sulcate:** grooved or furrowed, usually longitudinally
- sympatric:** growing together; having the same distribution
- talus:** fallen rock fragments at the base of a cliff or steep slope
- tendrils:** a slender, twining organ modified for climbing or support
- tepal:** a segment of a perianth, either a petal or a sepal

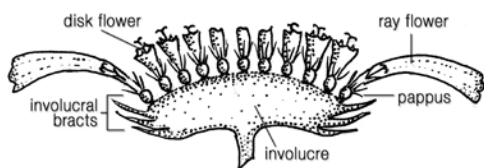
- terete:** circular in cross section; cylindrical
- terminal:** at the tip or apex
- ternate:** arranged in threes, as in leaflets
- thorn:** a stiff, woody stem with a sharp point, having conducting tissue
- tomentum:** a covering of soft, matted, tangled, or woolly hairs
- translucent:** not transparent, but allowing light to pass through
- trifid:** three-cleft
- trifoliate:** having a compound leaf with three leaflets
- tripinnate:** three times pinnately compound
- truncate:** abruptly or squarely cut off, as the base or tip of a leaf (see Leaf Tips & Bases illustration)
- tuber:** a short, thickened, underground stem, often modified for food storage
- tubercle:** a projection bearing areoles in some cacti; may coalesce into vertical ribs
- tuberculate:** having tubercles
- tubular:** having the shape of a tube or cylinder
- tuff, tuffaceous:** soil formed from volcanic ash flow
- turbinate:** shaped like a top
- two-ranked:** occurring in two vertical rows along the stem
- umbel:** a flower cluster in which the flower stalks arise from the same point (see Flower Structure illustration)
- undulate:** wavy (see Leaf Margins illustration)
- vestigial:** referring to an organ that is much reduced and probably nonfunctional
- villous:** having long, soft, shaggy, but not matted hairs
- vine:** a plant whose stem requires support; may be creeping, sprawling, or with tendrils and climbing on other supports
- viscid:** sticky or gummy
- whorled leaves, whorled branching pattern: three or more leaves or buds arising per node (see Leaf Arrangement & Types illustration)
- xeric:** dry or arid
- vestigial:** referring to an organ that is much reduced and probably nonfunctional
- villous:** having long, soft, shaggy, but not matted hairs
- vine:** a plant whose stem requires support; may be creeping, sprawling, or with tendrils and climbing on other supports
- viscid:** sticky or gummy whorled leaves, whorled branching pattern: three or more leaves or buds arising per node (see leaf arrangement diagram)
- xeric:** dry or arid



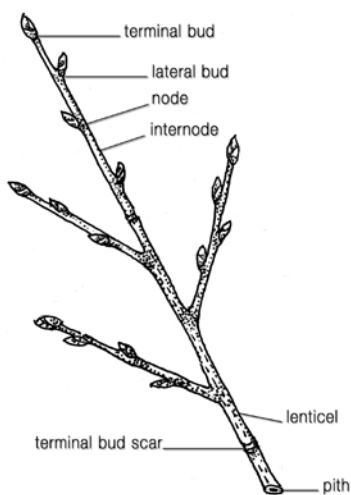
Leaf structure



Flower structure



Sunflower



Twig structure



Alternate



Opposite



Basal



Whorled



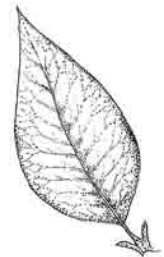
Scale-
like



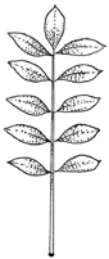
Awl-like



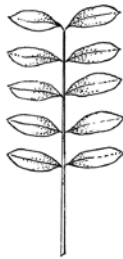
Leaf w/ some
other words that
I can't read on
the sample page



Simple
(pinnately
veined)



Compound
(odd
pinnately
veined)



Compound
(even
pinnately
veined)

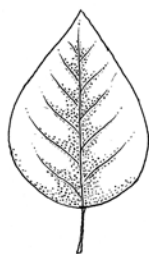


Simple (palmately
veined)

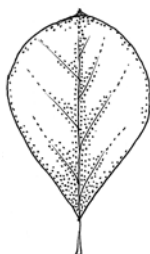


Compound
(palmately
veined)

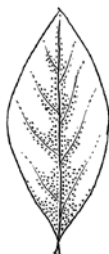
LEAF SHAPES



Ovate



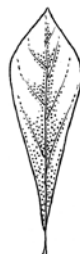
Obovate



Elliptic



Lanceolate



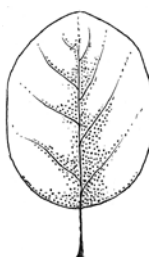
Oblanceolate



Linear



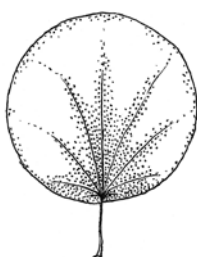
Oblong



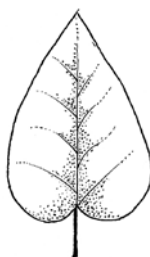
Oval



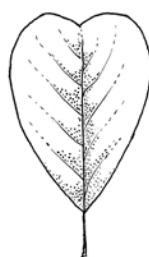
Spatulate



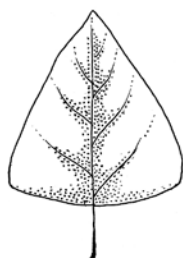
Orbicular



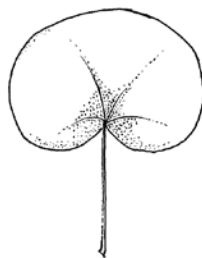
Cordate



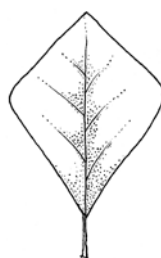
Obcordate



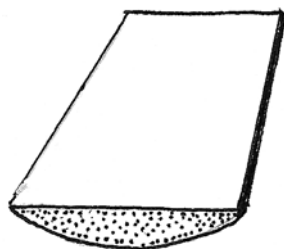
Deltoid



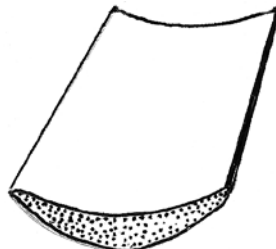
Reniform



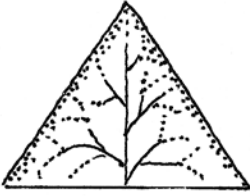
Rhombic



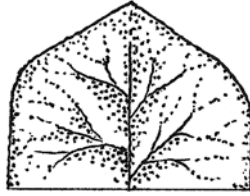
Plano-convex



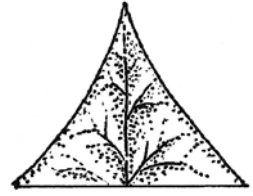
Concavo-convex



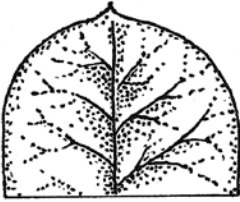
Acute



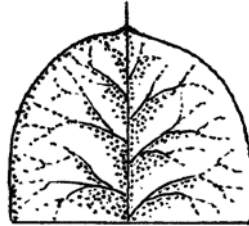
Obtuse



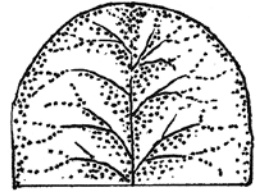
Acuminate



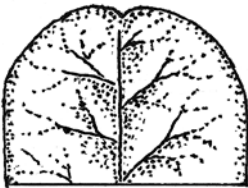
Mucronate



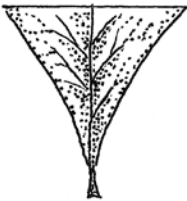
Cuspidate



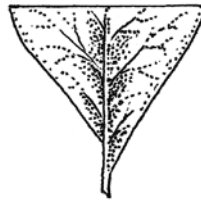
Rounded



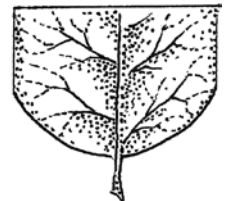
Emarginate



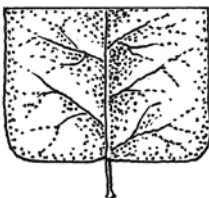
Cuneate



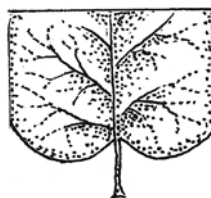
Oblique



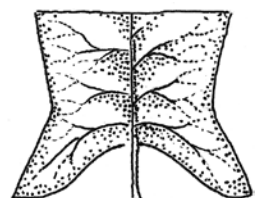
Rounded



Truncate



Cordate



Hastate

LEAF MARGINS



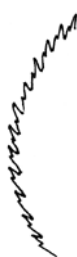
Entire



Serrate



Serrulate



Doubly serrate



Dentate



Crenate



Crenulate



Undulate



Lobed



Ciliate



Revolute



Involute



Solitary



Spike



Raceme



Panicle



Cyme



Corymb



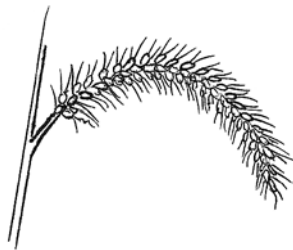
Umbel



Compound
Umbel



Head



Catkin

Appendix

Gymnosperms	Common Name	Synonyms
Cupressaceae 3 species (3 taxa)		

Juniperus communis Common juniper *J. sibirica* Burgsdorf; *J. communis* var. *sibirica* (Burgsdorf) Rydb.; *J. communis* var. *montana* Aiton.

Juniperus osteosperma Utah juniper *J. tetragona* var. *osteosperma* Torr.; *Sabina osteosperma* (Torr.) Anmtoine; *J. californica* var. *utahensis* Vasey; *J. californica* var. *utahensis* Engelm.; *J. occidentalis* var. *utahensis* (Engelm.) J.G. Lemmon.

Juniperus scopulorum Rocky Mountain juniper *J. virginiana* var. *scopulorum* (Sarg.) Lemmon; *J. virginiana* ssp. *scopulorum* (Sarg.) E. Murray; *J. virginiana* var. *montana* Vasey

Ephedraceae 4 species (5 taxa)		
---------------------------------------	--	--

Ephedra fasciculata Mojave ephedra *E. clokeyi* Cutler; *E. fasciculata* var. *clokeyi* (Cutler) Clokey

Ephedra nevadensis Nevada ephedra *E. antisiphilitica* S. Watson; *E. antisiphilitica* S. Watson var. *pedunculata* S. Watson; *E. nevadensis* subvar. *paucibracteata* Stapf

Ephedra torreyana Torrey's ephedra

Ephedra viridis var. *viridis* Green ephedra *Ephedra nevadensis* S. Watson subvar. *pluribracteata* Palmer ex Stapf; *E. nevadensis* var. *viridis* (Coville) M.E. Jones

Ephedra viridis var. *viscida* Cutler ephedra *E. cutleri*

Pinaceae 11 species (11 taxa)		
--------------------------------------	--	--

Abies concolor White fir *Picea concolor* Gordon & Glendinning; *Abies grandis* var. *concolor* (Gordon & Glendinning) Murray

Abies lasiocarpa Subalpine fir *Pinus* (*Abies*) *lasiocarpa* Hook.; *A. balsamea* ssp. *lasiocarpa* (Hook.) J. Boivin; *A. bifolia* A. Murray; *A. subalpina* Engelm. ex Ward

Picea engelmannii Engelmann spruce *Abies engelmannii* Parry ex Engelm.; *Picea glauca* ssp. *engelmannii* (Parry) Taylor

Picea pungens Blue spruce *Picea parryana* Sarg.

<i>Pinus contorta</i>	Lodgepole pine	<i>Pinus murrayana</i> Balfour in Murray; <i>P. contorta</i> var. <i>murrayana</i> (Balfour) Engelm. in S. Watson; <i>P. contorta</i> ssp. <i>murrayana</i> (Balfour) Critchfield
<i>Pinus edulis</i>	Two-needle pinyon pine	<i>Pinus monophylla</i> var. <i>edulis</i> (Engelm.) Jones; <i>P. cembroides</i> var. <i>edulis</i> (Engelm.) Voss
<i>Pinus flexilis</i>	Limber pine	<i>Pinus flexilis</i> (James) Rydb.
<i>Pinus longaeva</i>	Western bristlecone pine	<i>Pinus aristata</i> Engelm. var. <i>longaeva</i> (D.K. Bailey) Little
<i>Pinus monophylla</i>	Singleleaf pinyon	<i>Pinus edulis</i> var. <i>monophylla</i> (Torr. & Frém.) Voss
<i>Pinus ponderosa</i>	Ponderosa pine	
<i>Pseudotsuga menziesii</i> var. <i>glauca</i>	Douglas fir	<i>Abies menziesii</i> Mirbel; <i>Pinus taxifolia</i> Lambert; <i>Abies taxifolia</i> Poirét in Lamarck; <i>Pseudotsuga taxifolia</i> (Poirét) Britt.

Angiosperms	Common Name	Synonyms
-------------	-------------	----------

Adoxaceae 2 species (2 taxa)

<i>Sambucus caerulea</i>	Blue elderberry	<i>S. glauca</i> Nutt.
<i>Sambucus racemosa</i> var. <i>microbotrys</i>	Red elderberry	

Agavaceae 9 species (11 taxa)

<i>Agave utahensis</i> var. <i>utahensis</i>	Utah century plant	<i>Agave newberryi</i> Engelm.; <i>A. scaphoidea</i> Greenman & Roush; <i>A. utahensis</i> var. <i>discrea</i> M.E. Jones
<i>Nolina microcarpa</i>	Beargrass	
<i>Yucca angustissima</i> var. <i>angustissima</i>	Narrow leaf yucca	<i>Y. angustissima</i> var. <i>avia</i> Reveal is included in var. <i>angustissima</i>
<i>Yucca angustissima</i> var. <i>kanabensis</i>	Kanab yucca	<i>Y. kanabensis</i> McKelvey
<i>Yucca angustissima</i> var. <i>toftiae</i>	Toft's yucca	<i>Y. toftiae</i> S.L. Welsh
<i>Yucca baccata</i> var. <i>baccata</i>	Datil yucca	<i>Y. baccata</i> var. <i>vespertina</i> McKelvey; <i>Y. vespertina</i> (McKelvey) S.L. Welsh
<i>Yucca baileyi</i>	Bailey's yucca	<i>Y. navajoa</i> Webber; <i>Y. standleyi</i> McKelvey; <i>Y. baileyi</i> var. <i>intermedia</i> (McKelvey) Reveal
<i>Yucca brevifolia</i>	Joshua tree	<i>Y. draconis</i> L. var. <i>arborescens</i> Torr.; <i>Cleistoyucca arborescens</i> (Torr.) Trelease; <i>C. brevifolia</i> (Engelm.) Rydb.; <i>Yucca arborescens</i> (Torr.) Trelease; <i>Y. brevifolia</i> var. <i>herbertii</i> (J.M. Webber) Munz; <i>Y. brevifolia</i> var. <i>jaegeriana</i> McKelvey
<i>Yucca harrimaniae</i>	Harriman's yucca	<i>Y. gilbertiana</i> (Trelease) Rydb.; <i>Y. harrimaniae</i> var. <i>gilbertiana</i> Trelease; <i>Y. harrimaniae</i> var. <i>sterilis</i> Neese & S.L. Welsh

Angiosperms	Common Name	Synonyms
<i>Yucca schidigera</i>	Mojave yucca	<i>Y. californica</i> Nuttall ex Baker; <i>Y. mohavensis</i> Sarg.
<i>Yucca utahensis</i>	Utah yucca	<i>Yucca elata</i> var. <i>utahensis</i> (McKelvey) Reveal

Amaranthaceae 17 species (25 taxa)

<i>Allenrolfea occidentalis</i>	Pickleweed	<i>Halostachys occidentalis</i> S. Watson
<i>Atriplex canescens</i> var. <i>canescens</i>	Fourwing saltbush	<i>Calligonum canescens</i> Pursh; <i>Atriplex nuttallii</i> S. Watson
<i>Atriplex canescens</i> var. <i>gigantea</i>	Giant fourwing saltbush	
<i>Atriplex confertifolia</i>	Shadscale	<i>Obione confertifolia</i> Torr. & Frém.; <i>Atriplex collina</i> Wootton & Standley; <i>A. subconferta</i> Rydberg; <i>Obione rigida</i> Torr. & Frém.
<i>Atriplex corrugata</i>	Mat saltbush	<i>A. nuttallii</i> S. Watson var. <i>corrugata</i> (S. Watson) A. Nelson
<i>Atriplex gardneri</i> var. <i>bonnevillensis</i>	Bonneville saltbush	<i>Atriplex bonnevillensis</i> C.A. Hanson
<i>Atriplex gardneri</i> var. <i>cuneata</i>	Castle Valley saltbush	<i>Atriplex cuneata</i> A. Nelson; <i>A. acanthocarpa</i> (Torr.) S. Watson var. <i>cuneata</i> (A. Nelson) M.E. Jones; <i>A. nuttallii</i> S. Watson subsp. <i>cuneata</i> (A. Nelson) H.M. Hall & Clements; <i>A. oblanceolata</i> Rydb.
<i>Atriplex gardneri</i> var. <i>falcata</i>	Jones' saltbush	<i>Atriplex nuttallii</i> S. Watson var. <i>falcata</i> M.E. Jones; <i>A. falcata</i> (M.E. Jones) Standley; <i>A. nuttallii</i> var. <i>anomala</i> M.E. Jones; <i>A. nuttallii</i> subsp. <i>falcata</i> (M.E. Jones) H.M. Hall & Clements
<i>Atriplex gardneri</i> var. <i>gardneri</i>	Gardner's saltbush	
<i>Atriplex gardneri</i> var. <i>utahensis</i>	Basin saltbush	<i>Atriplex nuttallii</i> S. Watson var. <i>utahensis</i> M.E. Jones; <i>A. cuneata</i> A. Nelson var. <i>introgressa</i> C.A. Hanson; <i>A. gardneri</i> var. <i>tridentata</i> (Kuntze) J.F. Macbride
<i>Atriplex gardneri</i> var. <i>welshii</i>	Welsh's saltbush	<i>Atriplex welshii</i> C.A. Hanson
<i>Atriplex garrettii</i> var. <i>garrettii</i>	Garrett's saltbush	
<i>Atriplex hymenelytra</i>	Desert holly	<i>Obione hymenelytra</i> Torr.
<i>Atriplex lentiformis</i>	Big saltbush	<i>Obione lentiformis</i> Torr.; <i>A. breweri</i> S. Watson; <i>A. lentiformis</i> subsp. <i>breweri</i> (S. Watson) H.M. Hall & Clements; <i>A. lentiformis</i> var. <i>breweri</i> (S. Watson) McMin

Angiosperms	Common Name	Synonyms
<i>Atriplex obovata</i>	New Mexico saltbush	<i>Atriplex greggii</i> S. Watson; <i>A. jonesii</i> Standley; <i>A. obovata</i> var. <i>tuberala</i> J. F. Macbride
<i>Atriplex polycarpa</i>	Desert saltbush	<i>Obione polycarpa</i> Torr.; <i>Atriplex curvidens</i> Brandegee
<i>Atriplex torreyi</i> var. <i>torreyi</i>	Torrey's saltbush	<i>Obione torreyi</i> S. Watson; <i>Atriplex lentiformis</i> (Torr.) S. Watson subsp. <i>torreyi</i> (S. Watson) H.M. Hall & Clements; <i>A. lentiformis</i> var. <i>torreyi</i> (S. Watson) McMinn
<i>Grayia spinosa</i>	Spiny hopsage	<i>Chenopodium spinosum</i> Hook.; <i>Atriplex grayi</i> Col- lotzi ex W.A. Weber
<i>Kochia americana</i>	Gray molly	<i>Bassia americana</i> (S. Watson) A.J. Scott; <i>Kochia americana</i> var. <i>vestita</i> S. Watson; <i>K. vestita</i> (S. Watson) Rydb.
<i>Kochia prostrata</i> *	Forage kochia	<i>Bassia prostrata</i> (L.) A.J. Scott; <i>Salsola prostrata</i> L.
<i>Krascheninnikovia lanata</i>	Winterfat	<i>Diotis lanata</i> Pursh; <i>Ceratoides lanata</i> (Pursh) J.T. Howell; <i>Erotia lanata</i> (Pursh) Moquin-Tandon; <i>E. lanata</i> var. <i>subspinosa</i> (Rydb.) Kerney & Peebles
<i>Suaeda nigra</i>	Bush seepweed	<i>Chenopodium nigrum</i> Raf.; <i>Suaeda duripes</i> I.M. Johnston; <i>S. intermedia</i> S. Watson; <i>S. moquinii</i> (Torr.) Greene; <i>S. nigrescens</i> I.M. Johnston; <i>S. ramosissima</i> (Standley) I.M. Johnston; <i>S. suffrutescens</i> S. Watson; <i>S. suffrutescens</i> var. <i>detonsa</i> I.M. Johnston; <i>S. torreyana</i> S. Watson; <i>S. torreyana</i> var. <i>ramosissima</i> (Standl.) Munz
<i>Zuckia brandegeei</i> var. <i>arizonica</i>	Arizona siltbush	<i>Zuckia arizonica</i> Standley
<i>Zuckia brandegeei</i> var. <i>brandegeei</i>	Brandegee's hopsage	
<i>Zuckia brandegeei</i> var. <i>plummeri</i>	Plummer's siltbush	<i>Grayia brandegeei</i> A. Gray var. <i>plummeri</i> Stutz & S.C. Sanderson (as <i>brandegei</i>)

Anacardiaceae 4 species (5 taxa)

<i>Pistacia atlantica</i> *	Atlas pistachio	
<i>Rhus aromatica</i> var. <i>simplicifolia</i>	Simple leaf squawbush	<i>Rhus canadensis</i> var. <i>simplicifolia</i> Greene; <i>R. trilobata</i> var. <i>simplicifolia</i> (Greene) Barkley; <i>R. utahensis</i> Goodding
<i>Rhus aromatica</i> var. <i>trilobata</i>	Squawbush	<i>Rhus trilobata</i> Nuttall
<i>Rhus glabra</i>	Smooth sumac	<i>Rhus cismontane</i> Greene; <i>R. nitens</i> Greene
<i>Toxicodendron rydbergii</i>	Poison ivy	<i>Rhus rydbergii</i> Small ex Rydb.; <i>Toxicodendron longipes</i> E L. Greene

Angiosperms	Common Name	Synonyms
Asteraceae 82 species (110 taxa)		
<i>Acamptopappus sphaerocephalus</i> var. <i>sphaerocephalus</i>	Rayless goldenhead	<i>Haplopappus sphaerocephalus</i> Harvey & A. Gray
<i>Ambrosia dumosa</i>	Bursage	<i>Franseria dumosa</i> A. Gray
<i>Ambrosia eriocentra</i>	Woolly bursage	<i>Franseria eriocentra</i> A. Gray
<i>Ambrosia salsola</i>	Burrobush	<i>Hymenoclea salsola</i> Torr. & A. Gray
<i>Amphipappus fremontii</i> var. <i>spinosus</i>	Chaffbush	<i>Amphiachyris fremontii</i> (Torr. & A. Gray) A. Gray var. <i>spinosus</i> A. Nelson; <i>Amphipappus spinosus</i> A. Nelson; <i>A. fremontii</i> subsp. <i>spinosus</i> (A. Nelson) D.D. Keck
<i>Artemisia arbuscula</i> var. <i>arbuscula</i>	Low sagebrush	<i>Artemisia tridentata</i> Nutt. subsp. <i>arbuscula</i> (Nuttall) H.M. Hall & Clements; <i>A. tridentata</i> var. <i>arbuscula</i> (Nutt.) McMinn; <i>Seriphidium arbusculum</i> (Nutt.) W.A. Weber
<i>Artemisia arbuscula</i> var. <i>longiloba</i>	Longlobe sagebrush	<i>A. longiloba</i> (G.E. Osterhout) Beetle; <i>A. arbuscula</i> var. <i>longiloba</i> (G.E. Osterhout) Dorn; <i>A. arbuscula</i> ssp. <i>longiloba</i> (G.E. Osterhout) Shultz
<i>Artemisia arbuscula</i> var. <i>thermopola</i>	Hot springs sagebrush	<i>Seriphidium arbusculum</i> var. <i>thermopolum</i> (Beetle) Y.R. Ling
<i>Artemisia bigelovii</i>	Bigelow sagebrush	<i>Artemisia petrophilia</i> Wootton & Standley; <i>Seriphidium bigelovii</i> (A. Gray) K. Bremer & Humphries
<i>Artemisia cana</i> var. <i>viscidula</i>	Silver sagebrush	<i>Artemisia cana</i> Pursh var. <i>viscidula</i> G. E. Osterhout; <i>A. argillosa</i> Beetle; <i>A. viscidula</i> (Osterhout) Rydb.; <i>Seriphidium canum</i> (Pursh) W.A. Weber
<i>Artemisia filifolia</i>	Sand sagebrush	<i>Artemisia plattensis</i> Nutt.; <i>Oligosporus filifolius</i> (Torr.)
<i>Artemisia frigida</i>	Fringed sagebrush	<i>Artemisia frigida</i> var. <i>gmeliniana</i> (Besser) Besser; <i>A. frigida</i> var. <i>williamsiae</i> S.L. Welsh
<i>Artemisia nova</i> var. <i>duchesnicola</i>	Duchesne black sagebrush	
<i>Artemisia nova</i> var. <i>nova</i>	Black sagebrush	<i>Artemisia arbuscula</i> Nutt. subsp. <i>nova</i> (A. Nelson) G.H. Ward; <i>A. arbuscula</i> var. <i>nova</i> (A. Nelson) Cronquist; <i>A. tridentata</i> Nuttall subsp. <i>nova</i> (A. Nelson) H.M. Hall & Clements; <i>Seriphidium novum</i> (A. Nelson) W.A. Weber
<i>Artemisia pygmaea</i>	Pygmy sagebrush	<i>Seriphidium pygmaeum</i> (A. Gray) W.A. Weber
<i>Artemisia spiciformis</i>	Subalpine sagebrush	<i>A. tridentata</i> ssp. <i>spiciformis</i> (G.E. Osterhout) Goodrich & McArthur; <i>A. tridentata</i> var. <i>spiciformis</i> (G.E. Osterhout) Dorn
<i>Artemisia spinescens</i>	Budsage	<i>Picrothamnus desertorum</i> Nutt.

Angiosperms	Common Name	Synonyms
<i>Artemisia tridentata</i> subsp. <i>parishii</i>	Mojave sagebrush	<i>Artemisia parishii</i> A. Gray; <i>A. tridentata</i> var. <i>parishii</i> (A. Gray) Jepson; <i>Seriphidium tridentatum</i> (Nutt.) W.A. Weber subsp. <i>parishii</i> (A. Gray) W.A. Weber
<i>Artemisia tridentata</i> subsp. <i>tridentata</i>	Basin sagebrush	<i>Artemisia angustifolia</i> (A. Gray) Rydb.; <i>A. tridentata</i> subsp. <i>xericensis</i> Winward; <i>Seriphidium tridentatum</i> (Nutt.) W.A. Weber
<i>Artemisia tridentata</i> subsp. <i>vaseyana</i>	Mountain sagebrush	<i>Artemisia vaseyana</i> Rydb.; <i>A. tridentata</i> var. <i>pauciflora</i> Winward & Goodrich; <i>A. tridentata</i> var. <i>vaseyana</i> (Rydb.) B. Boivin; <i>Seriphidium vaseyanum</i> (Rydb.) W.A. Weber
<i>Artemisia tridentata</i> subsp. <i>wyomingensis</i>	Wyoming sagebrush	<i>Artemisia tridentata</i> var. <i>wyomingensis</i> (Beetle & A.M. Young) S.L. Welsh; <i>Seriphidium tridentatum</i> (Nutt.) W.A. Weber subsp. <i>wyomingense</i> (Beetle & A.M. Young) W.A. Weber
<i>Artemisia tripartita</i>	Three-tipped sagebrush	<i>Artemisia trifida</i> Nutt.; <i>A. tridentata</i> Nutt. subsp. <i>trifida</i> H.M. Hall & Clements; <i>Seriphidium tripartitum</i> (Rydb.) W.A. Weber
<i>Baccharis salicifolia</i>	Seepwillow	<i>Molina salicifolia</i> Ruiz & Pavon; <i>Baccharis glutinosa</i> Persoon; <i>B. viminea</i> DC.; <i>B. viminea</i> var. <i>atwoodii</i> S.L. Welsh
<i>Baccharis salicina</i>	Willow baccharis	<i>B. salicifolia</i> ; <i>B. emoryi</i>
<i>Baccharis sergiloides</i>	Desert baccharis	
<i>Baccharis wrightii</i>	Wright's baccharis	
<i>Bebbia juncea</i> var. <i>aspera</i>	Sweetbush	<i>Carphephorus juncea</i> Benth.; <i>Bebbia aspera</i> (Greene) A. Nelson
<i>Brickellia atractyloides</i> var. <i>atractyloides</i>	Spiny brickellbush	
<i>Brickellia californica</i>	California brickellbush	<i>Bulbostylis californica</i> Torr. & A. Gray; <i>Coleosanthus californicus</i> (Torr. & Gray) Kuntze
<i>Brickellia longifolia</i> var. <i>longifolia</i>	Longleaf brickellbush	<i>Coleosanthus longifolia</i> (S. Watson) Kuntze
<i>Brickellia microphylla</i> var. <i>microphylla</i>	Littleleaf brickellbush	<i>Brickellia microphylla</i> var. <i>watsonii</i> (B.L. Robinson) S.L. Welsh; <i>B. watsonii</i> B.L. Robinson
<i>Brickellia microphylla</i> var. <i>scabra</i>	Rough brickellbush	<i>Brickellia microphylla</i> subsp. <i>scabra</i> (A. Gray) W. A. Weber; <i>B. scabra</i> (A. Gray) A. Nelson ex B. L. Robinson
<i>Brickellia oblongifolia</i> var. <i>linifolia</i>	Mojave brickellbush	<i>Brickellia linifolia</i> D.C. Eaton
<i>Chrysothamnus depressus</i>	Dwarf rabbitbrush	<i>Ericameria depressa</i> (Nutt.) L.C. Anderson

Angiosperms	Common Name	Synonyms
<i>Chrysothamnus greenei</i>	Greene's rabbitbrush	<i>Bigelovia greenei</i> A. Gray
<i>Chrysothamnus scopulorum</i>	Mountain goldenweed	<i>Bigelovia menziesii</i> (Hook. & Arnott) A. Gray var. <i>scopulorum</i> M.E. Jones; <i>Haplopappus scopulorum</i> (M.E. Jones) S.F. Blake; <i>H. scopulorum</i> var. <i>hirtellous</i> S.F. Blake; <i>Hesperodoria scopulorum</i> (M.E. Jones) Greene
<i>Chrysothamnus stylosus</i>	Resinbush	<i>Grindelia stylosa</i> Eastwood, Proc. Calif. Acad. Sci., ser. 2, 6: 293. 1896; <i>Vanclevea stylosa</i> (Eastwood) Greene
<i>Chrysothamnus vaseyi</i>	Vasey's rabbitbrush	<i>Bigelovia vaseyi</i> A. Gray
<i>Chrysothamnus viscidiflorus</i> var. <i>axillaris</i>	Inyo rabbitbrush	<i>Chrysothamnus axillaris</i> D.D. Keck
<i>Chrysothamnus viscidiflorus</i> var. <i>lanceolatus</i>	Lanceleaf rabbitbrush	<i>Chrysothamnus lanceolatus</i> Nutt.; <i>C. viscidiflorus</i> subsp. <i>elegans</i> (Greene) H.M. Hall & Clements; <i>C. viscidiflorus</i> var. <i>lanceolatus</i> (Nutt.) Greene
<i>Chrysothamnus viscidiflorus</i> var. <i>puberulus</i>	Hairy low rabbitbrush	<i>Linosyris viscidiflora</i> Torr. & A. Gray var. <i>puberula</i> D.C. Eaton in S. Watson; <i>Chrysothamnus viscidiflorus</i> var. <i>puberulus</i> (D.C. Eaton) Jepson
<i>Chrysothamnus viscidiflorus</i> var. <i>viscidiflorus</i>	Sticky-flowered low rabbitbrush	<i>Chrysothamnus viscidiflorus</i> var. <i>latifolius</i> (D.C. Eaton) Greene; <i>C. viscidiflorus</i> subsp. <i>pumilus</i> (Nutt.) H.M. Hall & Clements; <i>C. viscidiflorus</i> var. <i>stenophyllus</i> (A. Gray) H.M. Hall
<i>Encelia farinosa</i>	Brittlebush	<i>Encelia farinosa</i> var. <i>phenicodonta</i> (S.F. Blake) I.M. Johnston
<i>Encelia resinifera</i>	Resin brittlebush	<i>Encelia frutescens</i> (A. Gray) A. Gray var. <i>resinosa</i> M.E. Jones
<i>Encelia virginensis</i>	Virgin brittlebush	<i>Encelia frutescens</i> (A. Gray) A. Gray var. <i>virginensis</i> (A. Nelson) S.F. Blake
<i>Ericameria albida</i>	Whiteflower rabbitbrush	<i>Bigelovia albida</i> M.E. Jones ex A. Gray; <i>Chrysothamnus albidus</i> (M.E. Jones ex A. Gray) Greene
<i>Ericameria cervina</i>	Deer goldenbush	<i>Haplopappus cervinus</i> S. Watson
<i>Ericameria crispa</i>	Crisped goldenbush	<i>Haplopappus crispus</i> L.C. Anderson
<i>Ericameria discoidea</i>	Whitestem goldenbush	<i>Macronema discoidea</i> Nutt.; <i>Haplopappus macronema</i> A. Gray
<i>Ericameria larcifolia</i>	Larchleaf goldenbush	<i>Haplopappus larcifolius</i> A. Gray
<i>Ericameria lignumviridis</i>	Greenwood goldenbush	<i>Haplopappus lignumviridis</i> S.L. Welsh

Angiosperms	Common Name	Synonyms
<i>Ericameria linearifolia</i>	Narrowleaf goldenbush	<i>Haplopappus linearifolius</i> DC.; <i>H. linearifolius</i> subsp. <i>interior</i> (Coville) H.M. Hall
<i>Ericameria nana</i>	Dwarf goldenbush	<i>Haplopappus nanus</i> (Nutt.) D.C. Eaton
<i>Ericameria nauseosa</i> var. <i>arenaria</i>	Sand rabbitbrush	<i>Chrysothamnus nauseosus</i> (Pallas ex Pursh) Britton subsp. <i>arenarius</i> L. C. Anderson; <i>C. nauseosus</i> var. <i>arenarius</i> (L.C. Anderson) S.L. Welsh
<i>Ericameria nauseosa</i> var. <i>bigelovii</i>	Bigelow's rabbitbrush	<i>Linosyris bigelovii</i> A. Gray; <i>Chrysothamnus nauseosus</i> (Pallas ex Pursh) Britton subsp. <i>bigelovii</i> (A. Gray) H.M. Hall & Clements
<i>Ericameria nauseosa</i> var. <i>graveolens</i>	Glabrate rabbitbrush	<i>Chrysocoma graveolens</i> Nutt.; <i>Chrysothamnus nauseosus</i> (Pallas ex Pursh) Britton subsp. <i>graveolens</i> (Nutt.) H.M. Hall & Clements; <i>C. nauseosus</i> var. <i>graveolens</i> (Nutt.) H.M. Hall; <i>Ericameria nauseosa</i> var. <i>glabrata</i> (A. Gray) G.L. Nesom & G.I. Baird
<i>Ericameria nauseosa</i> var. <i>hololeuca</i>	White rabbitbrush	<i>Bigelowia graveolens</i> Nutt. var. <i>hololeuca</i> A. Gray; <i>Chrysothamnus nauseosus</i> (Pallas ex Pursh) Britton var. <i>hololeucus</i> (A. Gray) H.M. Hall; <i>C. nauseosus</i> var. <i>gnaphaloides</i> (E.L. Greene) Hall
<i>Ericameria nauseosa</i> var. <i>iridis</i>	Rainbow Hills rabbitbrush	<i>C. nauseosus</i> var. <i>iridis</i> (L. C. Anderson) S.L. Welsh
<i>Ericameria nauseosa</i> var. <i>junceae</i>	Rush rabbitbrush	<i>Bigelowia juncea</i> Greene; <i>Chrysothamnus nauseosus</i> (Pallas ex Pursh) Britton var. <i>junceus</i> (Greene) H.M. Hall
<i>Ericameria nauseosa</i> var. <i>leiosperma</i>	Smoothseed rabbitbrush	<i>Bigelowia leiosperma</i> A. Gray; <i>Chrysothamnus nauseosus</i> (Pallas ex Pursh) Britton subsp. <i>leiospermus</i> (A. Gray) H.M. Hall & Clements
<i>Ericameria nauseosa</i> var. <i>nitida</i>	Shiny rabbitbrush	<i>Chrysothamnus nauseosus</i> (Pallas ex Pursh) Britton subsp. <i>nitidus</i> L.C. Anderson; <i>C. nauseosus</i> var. <i>nitidus</i> (L.C. Anderson) S.L. Welsh
<i>Ericameria nauseosa</i> var. <i>oreophila</i>	Great Basin rabbitbrush	<i>Chrysothamnus oreophilus</i> A. Nelson; <i>C. nauseosus</i> (Pallas ex Pursh) Britton var. <i>artus</i> (A. Nelson) Cronquist; <i>C. nauseosus</i> subsp. <i>consimilis</i> (Greene) H. M. Hall & Clements; <i>C. nauseosus</i> var. <i>consimilis</i> (Greene) H. M. Hall; <i>C. oreophilus</i> var. <i>artus</i> A. Nelson; <i>Ericameria nauseosa</i> var. <i>arta</i> (A. Nelson) G L. Nesom & G.I. Baird; <i>E. nauseosa</i> subsp. <i>consimilis</i> (Greene) G.L. Nesom & G.I. Baird.
<i>Ericameria nauseosa</i> var. <i>psilocarpa</i>	Smooth fruit rabbitbrush	<i>Chrysothamnus nauseosus</i> (Pallas ex Pursh) Britton var. <i>psilocarpus</i> S.F. Blake; <i>C. nauseosus</i> subsp. <i>psilocarpus</i> (S.F. Blake) L.C. Anderson
<i>Ericameria nauseosa</i> var. <i>salicifolia</i>	Willowleaf rabbitbrush	<i>Chrysothamnus salicifolius</i> Rydb.; <i>C. nauseosus</i> (Pallas ex Pursh) Britton subsp. <i>salicifolius</i> (Rydb.) H.M. Hall & Cements

Angiosperms	Common Name	Synonyms
<i>Ericameria nauseosa</i> var. <i>speciosa</i>	Whitestem rabbitbrush	<i>Chrysothamnus speciosus</i> Nutt.; <i>C. nauseosus</i> (Pallas ex Pursh) Britton subsp. <i>albicaulis</i> (Nutt.) H.M. Hall & Clements; <i>C. nauseosus</i> subsp. <i>speciosus</i> (Nutt.) H.M. Hall & Clements
<i>Ericameria nauseosa</i> var. <i>turbinata</i>	Dune rabbitbrush	<i>Bigelowia turbinata</i> M.E. Jones; <i>Chrysothamnus nauseosus</i> (Pallas ex Pursh) Britton var. <i>turbinatus</i> (M. E. Jones) H.M. Hall; <i>Ericameria nauseosa</i> subsp. <i>turbinata</i> (M.E. Jones) H.M. Hall & Clements
<i>Ericameria nauseosa</i> var. <i>uintahensis</i>	Uinta rabbitbrush	<i>Chrysothamnus nauseosus</i> var. <i>uintahensis</i> (L. C. Anderson) S.L. Welsh; <i>C. nauseosus</i> ssp. <i>uintahensis</i> L.C. Anderson; <i>Ericameria</i> x <i>uintahensis</i> (L.C. Anderson) G.L. Nesom & G.I. Baird
<i>Ericameria obovata</i>	Rydberg's goldenbush	<i>Macronema obovata</i> Rydb.; <i>Haplopappus rydbergii</i> S. F. Blake; <i>H. watsonii</i> A. Gray var. <i>rydbergii</i> (S. F. Blake) S.L. Welsh
<i>Ericameria paniculata</i>	Mojave rabbitbrush	<i>Bigelowia paniculata</i> A. Gray; <i>Chrysothamnus paniculatus</i> (A. Gray) H.M. Hall
<i>Ericameria parryi</i> var. <i>affinis</i>		<i>Chrysothamnus affinis</i> A. Nelson; <i>C. parryi</i> (A. Gray) Greene subsp. <i>affinis</i> (A. Nelson) L.C. Anderson; <i>C. parryi</i> var. <i>affinis</i> (A. Nelson) Cronquist
<i>Ericameria parryi</i> var. <i>howardii</i>	Howard's rabbitbrush	<i>Linosyris howardii</i> Parry ex A. Gray; <i>Chrysothamnus parryi</i> (A. Gray) Greene subsp. <i>howardii</i> (Parry ex A. Gray) H.M. Hall & Clements
<i>Ericameria parryi</i> var. <i>nevadensis</i>	Nevada rabbitbrush	<i>Linosyris howardii</i> Parry ex A. Gray var. <i>nevadensis</i> A. Gray; <i>Chrysothamnus parryi</i> (A. Gray) Greene subsp. <i>nevadensis</i> (A. Gray) H.M. Hall & Clements
<i>Ericameria parryi</i> var. <i>parryi</i>	Parry's rabbitbrush	<i>Chrysothamnus parryi</i> var. <i>parryi</i>
<i>Ericameria watsonii</i>	Watson's goldenbush	<i>Haplopappus watsonii</i> A. Gray var. <i>watsonii</i>
<i>Ericameria zionis</i>	Cedar Breaks goldenbush	<i>Haplopappus zionis</i> L.C. Anderson
<i>Gutierrezia microcephala</i>	Small-head snakeweed	<i>Brachyris microcephala</i> DC.; <i>G. sarothrae</i> var. <i>microcephala</i> (DC.) L. Benson; <i>Xanthocephalum microcephalum</i> (DC.) Shinnars
<i>Gutierrezia petradoria</i>	Goldenrod snakeweed	<i>Xanthocephalum petradoria</i> S.L. Welsh & Goodrich
<i>Gutierrezia pomariensis</i>	Orchard snakeweed	<i>G. sarothrae</i> var. <i>pomariensis</i> S.L. Welsh; <i>Xanthocephalum sarothrae</i> var. <i>pomariense</i> (S. L. Welsh) S.L. Welsh

Angiosperms	Common Name	Synonyms
<i>Gutierrezia sarothrae</i>	Broom snakeweed	<i>Solidago sarothrae</i> Pursh; <i>Xanthocephalum sarothrae</i> (Pursh) Shinnars
<i>Isocoma rusbyi</i>	Rusby's goldenbush	<i>Haplopappus rusbyi</i> (Greene) Cronquist
<i>Lepidospartum latisquamum</i>	Nevada broomshrub	
<i>Lorandersonia baileyi</i>	Bailey's rabbitbrush	<i>Chrysothamnus baileyi</i> Wooton & Standley; <i>C. pulchellus</i> (A. Gray) Greene subsp. <i>baileyi</i> (Wooton & Standley) H.M. Hall & Clements
<i>Lorandersonia linifolia</i>	Spearleaf rabbitbrush	<i>Chrysothamnus linifolius</i> Greene; <i>C. viscidiflorus</i> (Hook.) Nutt. subsp. <i>linifolius</i> (Greene) H.M. Hall & Clements
<i>Parthenium incanum</i>	Mariola	
<i>Perityle specuicola</i>	Alcove rock daisy	
<i>Perityle stansburii</i>	Stansbury's rock daisy	<i>Laphamia stansburii</i> A. Gray; <i>Perityle stansburyana</i> (Torr.) Macbride
<i>Perityle tenella</i>	Jones' rock daisy	<i>Laphamia palmeri</i> A. Gray; <i>L. palmeri</i> var. <i>tenella</i> M.E. Jones
<i>Petradoria pumila</i>	Rock goldenrod	<i>Crysoma pumila</i> Nutt.; <i>Solidago petradoria</i> Tidestrom
<i>Peucephyllum schottii</i>	Pigmy cedar	
<i>Pleiacanthus spinosus</i>	Thorny skeletonweed	<i>Lygodesmia spinosa</i> Nutt.; <i>Stephanomeria spinosa</i> (Nutt.) Tomb
<i>Pluchea sericea</i>	Arrowweed	<i>Polypappus sericeus</i> Nutt.; <i>Tessaria sericea</i> (Nutt.) Shinnars
<i>Porophyllum gracile</i>	Odora	
<i>Psilostrophe cooperi</i>	Whitestem paperflower	<i>Riddellia cooperi</i> A. Gray
<i>Senecio flaccidus</i> var. <i>flaccidus</i>	Hairy senecio	<i>Senecio douglasii</i> DC. var. <i>jamesii</i> (Torr. & A. Gray) Ediger; <i>S. douglasii</i> var. <i>longilobus</i> (Benth.) L.D. Benson; <i>S. longilobus</i> Benth.
<i>Senecio flaccidus</i> var. <i>monoensis</i>	Glabrous senecio	<i>Senecio monoensis</i> Greene; <i>S. filicifolius</i> Greenman; <i>S. lathyroides</i> Greene; <i>S. pectinatus</i> A. Nelson; <i>S. douglassii</i> var. <i>monoensis</i> (E L. Greene) Jepson
<i>Sphaeromeria diversifolia</i>	False sagebrush	<i>Tanacetum diversifolium</i> D.C. Eaton in S. Watson
<i>Sphaeromeria ruthiae</i>	Ruth's sphaeromeria	

Angiosperms	Common Name	Synonyms
<i>Tetradymia axillaris</i>	Longspine horsebrush	<i>Tetradymia spinosa</i> Hook. & Arnott var. <i>longispina</i> M.E. Jones; <i>T. longispina</i> (M.E. Jones) Rydb.
<i>Tetradymia canescens</i>	Gray horsebrush	<i>Tetradymia inermis</i> Nutt.
<i>Tetradymia glabrata</i>	Littleleaf horsebrush	
<i>Tetradymia nuttallii</i>	Nuttall's horsebrush	
<i>Tetradymia spinosa</i>	Spiny horsebrush	
<i>Thymophylla acerosa</i>	Dogweed	<i>Dyssodia acerosa</i> DC.; <i>Aciphyllaea acerosa</i> (DC.) A. Gray; <i>Hymenatherum acerosum</i> (DC.) A. Gray
<i>Xylorhiza confertifolia</i>	Henrieville woodyaster	<i>Machaeranthera glabriuscula</i> (Nutt.) Cronquist & D.D. Keck var. <i>confertifolia</i> Cronquist; <i>M. confertifolia</i> (Cronquist) Cronquist
<i>Xylorhiza cronquistii</i>	Cronquist's woodyaster	<i>Machaeranthera cronquistii</i> (S.L. Welsh & N.D. Atwood) Cronquist
<i>Xylorhiza glabriuscula</i>	Smooth woodyaster	<i>Aster parryi</i> A. Gray; <i>Machaeranthera glabriuscula</i> (Nutt.) Cronquist & D.D. Keck; <i>M. glabriuscula</i> var. <i>villosa</i> (Nutt.) A. Nelson; <i>X. villosa</i> Nutt.; <i>X. glabriuscula</i> Nutt. var. <i>glabriuscula</i>
<i>Xylorhiza linearifolia</i>	Moab woodyaster	<i>Xylorhiza glabriuscula</i> Nutt. var. <i>linearifolia</i> T. J. Watson; <i>Machaeranthera linearifolia</i> (T.J. Watson) Cronquist
<i>Xylorhiza tortifolia</i> var. <i>imberbis</i>	Glandular woodyaster	<i>Xylorhiza imberbis</i> (Cronquist) S.L. Welsh; <i>Machaeranthera tortifolia</i> var. <i>imberbis</i> Cronquist
<i>Xylorhiza tortifolia</i> var. <i>tortifolia</i>	Mojave woodyaster	<i>Haplopappus tortifolius</i> Torr. & A. Gray; <i>Machaeranthera tortifolia</i> (Torr. & A. Gray) Cronquist & D.D. Keck
<i>Xylorhiza venusta</i>	Cisco woodyaster	<i>Aster venustus</i> M.E. Jones; <i>Machaeranthera venusta</i> (M.E. Jones) Cronquist & D.D. Keck

Berberidaceae 3 species (3 taxa)

<i>Berberis fendleri</i>	Fendler's barberry	
<i>Berberis fremontii</i>	Fremont's barberry	<i>Mahonia fremontii</i> (Torr.) Fedde
<i>Berberis repens</i>	Creeping barberry	<i>Mahonia repens</i> (Lindley) G. Don; <i>M. sonnei</i> Abrams

Betulaceae 4 species (4 taxa)

<i>Alnus incana</i> ssp. <i>virescens</i>	Thinleaf alder	<i>Betula alnus</i> var. <i>incana</i> L.; <i>A. tenuifolia</i> Nutt.; <i>A. incana</i> ssp. <i>tenuifolia</i> (Nutt.) Breitung
---	----------------	---

Angiosperms	Common Name	Synonyms
<i>Betula glandulosa</i>	Bog birch	
<i>Betula occidentalis</i>	Western river birch	
<i>Ostrya knowltonii</i>	Western hophornbeam	

Bignoniaceae 1 species (1 taxon)

<i>Chilopsis linearis</i>	Desert willow	<i>Bignonia linearis</i> Cavanilles
---------------------------	---------------	-------------------------------------

Boraginaceae 1 species (1 taxon)

<i>Eriodictyon angustifolium</i>	Yerba Santa	
----------------------------------	-------------	--

Brassicaceae 4 species (4 taxa)

<i>Lepidium fremontii</i>	Fremont's pepperplant	<i>Nasturtium fremontii</i> (S. Watson) Kuntze, Revis
<i>Lepidium huberi</i>	Huber's pepperplant	
<i>Lepidium montanum</i> var. <i>jonesii</i>	Jones' pepperplant	<i>Lepidium jonesii</i> Rydb.; <i>L. alyssioides</i> var. <i>jonesii</i> (Rydb.) Thellung
<i>Stanleya pinnata</i>	Desert plume	<i>Cleome pinnata</i> Pursh; <i>Stanleya pinnatifida</i> Nutt.; <i>S. heterophylla</i> Nutt.; <i>S. fruticosa</i> Nutt.; <i>S. arcuata</i> Rydb.; <i>S. canescens</i> Rydb.; <i>S. glauca</i> Rydb.; <i>S. integrifolia</i> E. James

Cactaceae 34 species (38 taxa)

<i>Coryphantha chlorantha</i>	Mojave pincushion	<i>Mammillaria chlorantha</i> Engelm.; <i>Coryphantha vivipara</i> (Engelm.) Britton & Rose var. <i>buofalma</i> P. C. Fischer; <i>C. vivipara</i> var. <i>deserti</i> (Engelm.) W.T. Marshall; <i>Escobaria deserti</i> (Engelm.) Buxbaum; <i>E. vivipara</i> (Nutt.) Buxbaum var. <i>deserti</i> (Engelm.) D.R. Hunt
<i>Coryphantha missouriensis</i>	Missouri pincushion	<i>Mammillaria missouriensis</i> Sweet; <i>Coryphantha missouriensis</i> var. <i>caespitosa</i> (Engelm.) L.D. Benson; <i>C. missouriensis</i> var. <i>robustior</i> (Engelm.) L.D. Benson; <i>Escobaria missouriensis</i> (Sweet) D.R. Hunt; <i>Neobesseyia missouriensis</i> (Sweet) Britton & Rose; <i>N. similis</i> (Engelm.) Britton & Rose; <i>Neomam millaria missouriensis</i> (Sweet) Britton & Rose ex. Rydb.
<i>Coryphantha vivipara</i>	Pincushion cactus	<i>Cactus viviparus</i> Nutt.; <i>Coryphantha missouriensis</i> (Sweet) Britton & Rose var. <i>marstonii</i> (Clover) L.D. Benson; <i>C. vivipara</i> var. <i>arizonica</i> (Engelm.) W.T. Marshall; <i>C. vivipara</i> var. <i>bisbeeana</i> (Orcutt) L.D. Benson; <i>C. vivipara</i> var. <i>kaibabensis</i> P.C. Fischer; <i>C. vivipara</i> var. <i>neomexicana</i> (Engelm.) Backeberg; <i>C. vivipara</i> var. <i>radiosa</i> (Engelm.) Backeberg; <i>C. vivipara</i> var. <i>rosea</i> (Clokey) L.D. Benson; <i>Escobaria vivipara</i> (Nutt.) Buxbaum

Angiosperms	Common Name	Synonyms
<i>Cylindropuntia acanthocarpa</i> var. <i>coloradensis</i>	Buckhorn cholla	<i>Opuntia acanthocarpa</i> Engelm. & Bigelow var. <i>coloradensis</i> L.D. Benson
<i>Cylindropuntia echinocarpa</i>	Silver cholla; golden cholla	<i>Opuntia echinocarpa</i> Engelm. & J.M. Bigelow
<i>Cylindropuntia whipplei</i>	Whipple's cholla	<i>Opuntia whipplei</i> Engelm. & J.M. Bigelow; <i>Cylindropuntia hualpaensis</i> Backeberg; <i>C. whipplei</i> var. <i>enodis</i> (Peebles) Backeberg; <i>Opuntia whipplei</i> var. <i>laevior</i> Engelm.
<i>Echinocereus coccineus</i>	Scarlet hedgehog cactus	<i>Echinocereus coccineus</i> subsp. <i>aggregatus</i> (Engelm. ex S. Watson) W. Blum, Mich., Lang & Rutow; <i>E. triglochidiatus</i> Engelm. var. <i>melanacanthus</i> (Engelm.) L.D. Benson; <i>E. canyonensis</i> Clover & Jotter
<i>Echinocereus engelmannii</i>	Pink-flowered hedgehog cactus	<i>Cereus engelmannii</i> Parry ex Engelm.; <i>Echinocereus engelmannii</i> var. <i>armatus</i> L.D. Benson; <i>E. engelmannii</i> var. <i>chrysocentrus</i> (Engelm. & Bigelow) R��ppler; <i>E. engelmannii</i> var. <i>howei</i> L.D. Benson
<i>Echinocereus mojavenensis</i>	Mojave hedgehog cactus	<i>Echinocereus triglochidiatus</i> Engelm. var. <i>mojavenensis</i> (Engelm. & Bigelow) L.D. Benson
<i>Echinomastus johnsonii</i>	Johnson's little barrel cactus	<i>Echinocactus johnsonii</i> Parry ex Engelm.; <i>Neolloydia johnsonii</i> (Parry ex Engelm.) L.D. Benson; <i>Sclerocactus johnsonii</i> (Parry ex Engelm.) N.P. Taylor
<i>Ferocactus cylindraceus</i>	Red barrel cactus	<i>Echinocactus viridescens</i> Torr. & A. Gray var. <i>cylindraceus</i> Engelm.; <i>Ferocactus acanthodes</i> (Lemaire) Britton & Rose var. <i>eastwoodiae</i> L.D. Benson; <i>F. acanthodes</i> var. <i>lecontei</i> (Engelm.) G E. Lindsay; <i>F. eastwoodiae</i> (L.D. Benson) L.D. Benson
<i>Grusonia pulchella</i>	Sand club-cholla	<i>Opuntia pulchella</i> Engelm.; <i>Corynopuntia pulchella</i> (Engelm.) F.M. Knuth; <i>Micropuntia barkeleyana</i> Daston
<i>Mammillaria tetrancistra</i>	Little fishhook cactus	
<i>Opuntia aurea</i>	Pipe Springs cactus	<i>Opuntia basilaris</i> Engelm. & J.M. Bigelow var. <i>aurea</i> (E.M. Baxter W.T. Marshall; <i>O. erinacea</i> Engelm. var. <i>aurea</i> (E M. Baxter) S.L. Welsh
<i>Opuntia basilaris</i> var. <i>basilaris</i>	Beavertail pricklypear	<i>Opuntia basilaris</i> var. <i>ramosa</i> Parish; <i>O. whitneyana</i> E.M. Baxter
<i>Opuntia basilaris</i> var. <i>heilii</i>	Heil's beavertail	<i>Opuntia longiareolata</i> Clover & Jotter; <i>O. heilii</i> S.L. Welsh & Neese
<i>Opuntia chlorotica</i>	Silver dollar cactus	
<i>Opuntia engelmannii</i> var. <i>engelmannii</i>	Engelmann's pricklypear	<i>Opuntia dillei</i> Griffiths; <i>O. discata</i> Griffiths; <i>O. phaeacantha</i> Engelm. var. <i>discata</i> (Griffiths) L.D. Benson & Walkington

Angiosperms	Common Name	Synonyms
<i>Opuntia fragilis</i>	Brittle pricklypear	<i>Cactus fragilis</i> Nutt.; <i>O. brachyarthra</i> Engelm. & J.M. Bigelow; <i>O. fragilis</i> var. <i>brachyarthra</i> (Engelm. & J.M. Bigelow) J.M. Coulter
<i>Opuntia macrorhiza</i>	Plains pricklypear	<i>Opuntia compressa</i> (Salisbury) J.F. Macbride var. <i>macrorhiza</i> (Engelm.) L.D. Benson; <i>O. phaeacantha</i> Raf. var. <i>macrorhiza</i> (Engelm.) J.M. Coulter
<i>Opuntia phaeacantha</i>	Brown-spined pricklypear	<i>Opuntia angustata</i> Engelm. & J.M. Bigelow; <i>O. phaeacantha</i> var. <i>brunnea</i> Engelm.; <i>O. phaeacantha</i> var. <i>laevis</i> (J.M. Coulter) L.D. Benson; <i>O. phaeacantha</i> var. <i>major</i> Engelm.; <i>O. superbospina</i> Griffiths
<i>Opuntia pinkavae</i>	Pinkava pricklypear	<i>Opuntia basilaris</i> var. <i>woodburyi</i> W. Earle; <i>O. macrorhiza</i> Engelm.
<i>Opuntia polyacantha</i> var. <i>erinacea</i>	Mojave pricklypear	<i>Opuntia erinacea</i> Engelm. & J.M. Bigelow; <i>O. erinacea</i> var. <i>ursina</i> (F.A.C. Weber) Parish; <i>O. hystricina</i> Engelm. & Bigelow var. <i>ursina</i> (F.A.C. Weber) Backeberg; <i>O. ursina</i> F.A.C. Weber
<i>O. polyacantha</i> var. <i>hystricina</i>	Porcupine pricklypear	<i>Opuntia hystricina</i> Engelm. & J. M. Bigelow; <i>O. erinacea</i> Engelm. & J.M. Bigelow var. <i>hystricina</i> (Engelm. & J. M. Bigelow) L.D. Benson; <i>O. erinacea</i> var. <i>rhodantha</i> (K. Schumann) L.D. Benson; <i>O. erinacea</i> var. <i>xanthostemma</i> (K. Schumann) L.D. Benson; <i>O. rhodantha</i> K. Schumann; <i>O. xanthostemma</i> K. Schumann
<i>O. polyacantha</i> var. <i>nicholii</i>	Navajo Bridge pricklypear	<i>Opuntia nicholii</i> L.D. Benson; <i>O. hystricina</i> Engelm. & J. M Bigelow var. <i>nicholii</i> (L. D. Benson) Backeberg
<i>O. polyacantha</i> var. <i>polyacantha</i>	Central pricklypear	<i>Opuntia heacockiae</i> G. Arp; <i>O. juniperina</i> Britton & Rose; <i>O. polyacantha</i> var. <i>juniperina</i> (Britton & Rose) L.D. Benson; <i>O. polyacantha</i> var. <i>rufispina</i> (Engelm. & J.M. Bigelow) L.D. Benson; <i>O. polyacantha</i> var. <i>trichophora</i> (Engelm.) J.M. coulter; <i>O. trichophora</i> Engelm.
<i>Pediocactus despainii</i>	Despain's cactus	<i>Pediocactella bradyi</i> (L D. Benson) Doweld var. <i>despainii</i> (S.L. Welsh & Goodrich) Doweld; <i>Pediocactus bradyi</i> L.D. Benson subsp. <i>despainii</i> (S.L. Welsh & Goodrich) Hochstätter; <i>P. bradyi</i> var. <i>despainii</i> (S.L. Welsh & Goodrich) Hochstätter
<i>Pediocactus sileri</i>	Siler's cactus	<i>Echinocactus sileri</i> Engelm.; <i>Utahia sileri</i> (Engelm. ex J.M. Coulter) Britton & Rose

Angiosperms	Common Name	Synonyms
<i>Pediocactus simpsonii</i>	Simpson's cactus	<i>Echinocactus simpsonii</i> Engelm.; <i>E. simpsonii</i> var. <i>minor</i> Engelm.; <i>E. simpsonii</i> var. <i>robustior</i> J. M. Coulter; <i>Mammillaria simpsonii</i> (Engelm.) M.E. Jones; <i>Pediocactus simpsonii</i> subsp. <i>bensonii</i> (Engelm.) Hochstätter; <i>P. simpsonii</i> var. <i>heermannii</i> (W.T. Marshall) W.T. Marshall; <i>P. simpsonii</i> subsp. <i>idahoensis</i> Hochstätter; <i>P. simpsonii</i> var. <i>indraianus</i> Hochstätter; <i>P. simpsonii</i> subsp. <i>robustior</i> (J. M. Coulter) Hochstätter; <i>P. simpsonii</i> var. <i>robustior</i> (Engelm.) L.D. Benson
<i>Pediocactus winkleri</i>	Winkler's cactus	<i>Pediocactella bradyi</i> (L.D. Benson) Doweld subsp. <i>winkleri</i> (K.D. Heil) Doweld; <i>Pediocactus bradyi</i> L.D. Benson subsp. <i>winkleri</i> (K.D. Heil) Hochstätter; <i>P. bradyi</i> var. <i>winkleri</i> (K.D. Heil) Hochstätter
<i>Sclerocactus blainei</i>	Blaine's little barrel cactus	<i>Pediocactus spinosior</i> (Engelm.) Halda var. <i>schlesseri</i> (K.D. Heil & S.L. Welsh) Halda; <i>Sclerocactus schlesseri</i> K.D. Heil & S.L. Welsh; <i>S. spinosior</i> (Engelm.) D. Woodruff & L. D. Benson subsp. <i>blainei</i> (S.L. Welsh & K.H. Thorne) Hochstätter
<i>Sclerocactus brevispinus</i>	Pariette cactus	<i>Sclerocactus wetlandicus</i> Hochstätter var. <i>ilseae</i> Hochstätter; <i>S. whipplei</i> (Engelm.) Britton & Rose var. <i>ilseae</i> (Hochstätter) S.L. Welsh
<i>Sclerocactus parviflorus</i>	Common little barrel cactus	<i>Echinocactus parviflorus</i> (Clover & Jotter) L.D. Benson; <i>Sclerocactus contortus</i> K.D. Heil; <i>S. whipplei</i> (Engelmann & J. M. Bigelow) Britton & Rose var. <i>intermedius</i> (Peebles) L.D. Benson; <i>S. whipplei</i> var. <i>roseus</i> (Clover) L.D. Benson
<i>Sclerocactus pubispinus</i>	Great Basin little barrel cactus	<i>Echinocactus pubispinus</i> Engelmann; <i>Ferocactus pubispinus</i> (Engelmann) N. P. Taylor; <i>Sclerocactus pubispinus</i> var. <i>pubispinus</i> (Engelmann) L. Benson
<i>Sclerocactus spinosior</i>	Spiny little barrel cactus	<i>Echinocactus whipplei</i> Engelm. & J. M. Bigelow var. <i>spinosior</i> Engelm.; <i>Ferocactus spinosior</i> (Engelm.) N.P. Taylor; <i>Pediocactus spinosior</i> (Engelm.) Halda; <i>Sclerocactus pubispinus</i> (Engelm.) L.D. Benson var. <i>spinosior</i> (Engelm.) S. L. Welsh
<i>Sclerocactus wetlandicus</i>	Uinta Basin hookless cactus	<i>Pediocactus wetlandicus</i> (Hochstätter) Halda; <i>Sclerocactus pubispinus</i> (Engelm.) L. Benson var. <i>glaucus</i> (Purpus) S.L. Welsh
<i>Sclerocactus whipplei</i>	Whipple's little barrel cactus	<i>Echinocactus whipplei</i> Engelm. & J.M. Bigelow; <i>Ferocactus whipplei</i> (Engelm. & J.M. Bigelow) N.P. Taylor; <i>Pediocactus whipplei</i> (Engelm. & J.M. Bigelow); <i>Sclerocactus whipplei</i> var. <i>pygmaeus</i> Peebles
<i>Sclerocactus wrightiae</i>	Wright's little barrel cactus	<i>Ferocactus wrightiae</i> (L.D. Benson) N.P. Taylor; <i>Pediocactus wrightiae</i> (L.D. Benson) Arp

Angiosperms	Common Name	Synonyms
Cannabaceae 2 species (2 taxa)		
<i>Celtis reticulata</i>	Netleaf hackberry	<i>C. villosula</i> Rydb.
<i>Humulus lupulus</i> var. <i>neomexicanus</i>	American hop	<i>H. americanus</i> Nutt.
Caprifoliaceae 6 species (6 taxa)		
<i>Linnaea borealis</i>	Twin flower	
<i>Lonicera involucrata</i>	Black twinberry	<i>Xylosteum involucratum</i> Richardson; <i>L. ledebourii</i> Eschscholtz
<i>Lonicera utahensis</i>	Utah honeysuckle	
<i>Symphoricarpos longiflorus</i>	Long-flowered snowberry	
<i>Symphoricarpos occidentalis</i>	Western snowberry	
<i>Symphoricarpos oreophilus</i>	Mountain snowberry	
Caryophyllaceae 1 species (1 taxon)		
<i>Eremogone macradenia</i>	Shrubby sandwort	<i>Arenaria macradenia</i> S. Watson
Celastraceae 2 species (2 taxa)		
<i>Mortonia scabrella</i> var. <i>utahensis</i>	Mortonia	
<i>Paxistima myrsinites</i>	Mountain lover	<i>Ilex myrsinites</i> Pursh
Cornaceae 1 species (1 taxon)		
<i>Cornus sericea</i> var. <i>sericea</i>	Red-osier dogwood	<i>Thelycrania sericea</i> (L.) Dandy; <i>Cornus stolonifera</i> Michaux; <i>Suida stolonifera</i> (Michaux) Rydberg; <i>C. sericea</i> ssp. <i>stolonifera</i> (Michaux) Fosberg
Crossomataceae 1 species (1 taxon)		
<i>Glossopetalon spinescens</i>	Greasebush	<i>Glossopetalon nevadense</i> A. Gray; <i>Forsellesia nevadensis</i> (A. Gray) Greene; <i>Glossopetalon meionandrum</i> Koehne; <i>Forsellesia meionandra</i> (Koehne) Heller
Elaeagnaceae 5 species (5 taxa)		
<i>Elaeagnus angustifolia</i> *	Russian olive	
<i>Elaeagnus commutata</i>	Silverberry	

Angiosperms	Common Name	Synonyms
<i>Shepherdia argentea</i>	Silver buffaloberry	<i>Hippophae argentea</i> Pursh; <i>Lepargyrea argentea</i> (Pursh) Greene
<i>Shepherdia canadensis</i>	Soapberry	<i>Hippophae canadensis</i> L.; <i>Lepargyrea canadensis</i> (L.) Greene
<i>Shepherdia rotundifolia</i>	Roundleaf buffaloberry	<i>Lepargyrea rotundifolia</i> (Parry) Greene

Ericaceae 15 species (15 taxa)

<i>Arctostaphylos patula</i>	Greenleaf manzanita	<i>Arctostaphylos pungens</i> var. <i>platyphylla</i> A. Gray; <i>A. platyphylla</i> (A. Gray) Kuntze; <i>Uva-ursi patula</i> (Greene) Abrams
<i>Arctostaphylos pringlei</i>	Pringle's manzanita	<i>Uva-ursi pringlei</i> (Parry) Abrams
<i>Arctostaphylos pungens</i>	Point-leaf manzanita	<i>Daphnidostaphylis pungens</i> (Kunth) Klotzsch
<i>Arctostaphylos uva-ursi</i>	Kinnikinnick	<i>Arbutus uva-ursi</i> L.
<i>Chimaphila menziesii</i>	Menzies' chimaphila	<i>Pyrola menziesii</i> R. Br. Ex D. Don
<i>Chimaphila umbellatum</i>	Pipsissewa	
<i>Gaultheria humifusa</i>	Alpine wintergreen	<i>Vaccinium humifusum</i> Graham; <i>Gaultheria myrsinites</i> Hook.
<i>Kalmia microphylla</i>	Bog laurel	<i>Kalmia glauca</i> var. <i>microphylla</i> Hook.
<i>Pyrola secunda</i>	Secund wintergreen	<i>Ramischia secunda</i> (L.) Garcke; <i>Actinocyclus secundus</i> (L.) Klotzsch; <i>Orthilla secunda</i> (L.) House; <i>P. secunda</i> var. <i>obtusata</i> Turczinanow; <i>Orthilia secunda</i> var. <i>obtusata</i> (Turczinanow) House
<i>Rhododendron neoglandulosum</i>	Labrador tea	<i>Ledum glandulosum</i> Nutt.
<i>Vaccinium caespitosum</i>	Dwarf whortleberry	
<i>Vaccinium membranaceum</i>	Mountain whortleberry	<i>V. globulare</i> Rydb.
<i>Vaccinium myrtillus</i>	Blue whortleberry	<i>V. myrtilloides</i> sensu S. Watson
<i>Vaccinium scoparium</i>	Red whortleberry	<i>V. myrtillus</i> var. <i>microphyllum</i> Hook.; <i>V. myrtillus</i> var. <i>oreophilum</i> (Rydb.) Dorn; <i>V. microphyllum</i> (Hook.) Rydb.
<i>Vaccinium uliginosum</i> var. <i>occidentale</i>	Bog whortleberry	

Angiosperms	Common Name	Synonyms
Fabaceae 12 species (13 taxa)		
<i>Acacia greggii</i>	Catclaw acacia	<i>A. greggii</i> var. <i>arizonica</i> Isely
<i>Cercis occidentalis</i> var. <i>orbiculata</i>	Western redbud	<i>C. canadensis</i> L. var. <i>orbiculata</i> (Greene) Barneby; <i>C. arizonica</i> Rose ex Dodge
<i>Lotus rigidus</i>	Broom lotus	<i>Hosackia rigida</i> Benth.; <i>Anisolotus rigidus</i> (Benth.) Rydb.
<i>Parryella filifolia</i>	Narrow-leaf dunebroom	
<i>Prosopis glandulosa</i> var. <i>torreyana</i>	Honey mesquite	<i>Algarobia glandulosa</i> (Torr.) Torr. & A. Gray; <i>Prosopis juliflora</i> var. <i>glandulosa</i> (Torr.) Cockerell; <i>Neltuma glandulosa</i> (Torr.) Britton & Rose
<i>Prosopis pubescens</i>	Screwbean mesquite	<i>P. odorata</i> (Torr. & Frém.) emend S.L. Welsh; <i>Spirolobium odoratum</i> Torr. & Frém. in Frém.; <i>Strombocarpa pubescens</i> (Benth.) A. Gray; <i>P. emoryi</i> Torr. in Emory
<i>Psorothamnus arborescens</i> var. <i>pubescens</i>	Mojave dalea	<i>Dalea arborescens</i> Torr. ex A. Gray; <i>Parosela arborescens</i> (Torr.) A. Heller; <i>Psorodendron arborescens</i> (Torr.) Rydb.; <i>Dalea amoena</i> S. Watson; <i>Parosela amoena</i> (S. Watson) Vail; <i>Psorodendron amoenum</i> (S. Watson) Rydb.
<i>Psorothamnus fremontii</i>	Fremont's indigo-bush	<i>Dalea fremontii</i> Torr. ex A. Gray; <i>Parosela fremontii</i> (Torr.) Vail; <i>Psorodendron fremontii</i> (Torr.) Rydb.; <i>Dalea johnsonii</i> S. Watson; <i>Parosela johnsonii</i> (S. Watson) Vail; <i>Psorodendron johnsonii</i> (S. Watson) Rydberg
<i>Psorothamnus nummularius</i>	Jones' indigo-bush	<i>Dalea nummularia</i> M.E. Jones; <i>Psorothamnus polyadenius</i> var. <i>jonesii</i> Barneby
<i>Psorothamnus polydenius</i>	Glandular indigo-bush	<i>Dalea polydenia</i> Torr. ex S. Watson; <i>Parosela polydenia</i> (Torr.) A. Heller
<i>Psorothamnus thompsoniae</i> var. <i>thompsoniae</i>	Thompson's indigo-bush	<i>Parosela thompsoniae</i> Vail; <i>Dalea thompsoniae</i> L. O. Williams
<i>Psorothamnus thompsoniae</i> var. <i>whitingii</i>	Whiting's indigo-bush	<i>Dalea whitingi</i> Kerney & Peebles; <i>Psorothamnus thompsoniae</i> var. <i>whitingi</i> Barneby
<i>Robinia neomexicana</i>	New Mexico locust	<i>Robinia neomexicana</i> var. <i>luxurians</i> Dieck ex Goeze; <i>R. luxurians</i> (Dieck ex Goeze) Rydb.; <i>R. breviloba</i> Rydb.; <i>R. subvelutina</i> Rydb.
Fagaceae 3 species (3 taxa)		
<i>Quercus gambelii</i>	Gambel oak	<i>Q. stellata</i> var. <i>utahensis</i> DC.; <i>Q. utahensis</i> (DC.) Rydb.
<i>Quercus havardii</i>	Havard oak	<i>Q. welshii</i> R. A. Denham; <i>Q. undulata</i> Torrey; <i>Q. havardii</i> var. <i>tuckeri</i> S.L. Welsh

Angiosperms	Common Name	Synonyms
<i>Quercus turbinella</i>	Dixie live-oak	<i>Q. dumosa</i> var. <i>turbinella</i> (Greene) Jepson; <i>Q. sub-turbinella</i> Trelease

Garryaceae 1 species (1 taxon)

<i>Garrya flavescens</i>	Silk-tassel bush
--------------------------	------------------

Grossulariaceae 12 species (12 taxa)

<i>Ribes aureum</i>	Golden currant	
<i>Ribes cereum</i> var. <i>inebrians</i>	Wax currant	<i>R. inebrians</i> Lindl.
<i>Ribes hudsonianum</i> var. <i>petiolare</i>	Northern black currant	<i>R. petiolare</i> Douglas
<i>Ribes inerme</i>	Whitestem gooseberry	<i>Grossularia inermis</i> (Rydb.) Coville & Britton
<i>Ribes lacustre</i>	Swamp gooseberry	<i>R. oxyacanthoides</i> var. <i>lacustre</i> Persoon
<i>Ribes laxiflorum</i>	Trailing black currant	<i>R. affinie</i> Douglas; <i>R. coloradense</i> Coville
<i>Ribes leptanthum</i>	Trumpet gooseberry	<i>Grossularia leptantha</i> (A. Gray) Coville & Britton
<i>Ribes montigenum</i>	Mountain gooseberry	<i>R. nubigenum</i> McClatchie; <i>R. lacustre</i> var. <i>molle</i> A. Gray; <i>R. lacustre</i> var. <i>lentum</i> M.E. Jones; <i>R. lentum</i> (M.E. Jones) Coville & Rose
<i>Ribes oxyacanthoides</i>	Inland gooseberry	<i>Grossularia oxyacanthoides</i> (L.) Miller; <i>R. setosum</i> Lindley
<i>Ribes velutinum</i> var. <i>velutinum</i>	Desert gooseberry	<i>Ribes leptanthum</i> var. <i>brachyanthum</i> A. Gray; <i>Grossularia velutina</i> (Greene) Coville & Britton
<i>Ribes viscosissimum</i>	Sticky currant	
<i>Ribes wolfii</i>	Rothrock's currant	<i>R. mogollonicum</i> Greene

Hydrangeaceae 5 species (5 taxa)

<i>Fendlera rupicola</i>	Fendlerbush	
<i>Fendlerella utahensis</i>	Utah fendlerella	<i>Whipplea utahensis</i> S. Watson; <i>Fendlera utahensis</i> (S. Watson) Greene; <i>Fendlerella cymose</i> Greene
<i>Jamesia americana</i>	Cliff jamesia	<i>Edwinia americana</i> (Torr. & A. Gray) A. Heller
<i>Jamesia tetrapetala</i>	Basin jamesia	
<i>Philadelphus microphyllus</i>	Littleleaf mockorange	<i>P. microphyllus</i> var. <i>occidentalis</i> (A. Nelson) Dorn; <i>P. microphyllus</i> ssp. <i>stramineus</i> <i>P. zionensis</i> C.L. Hitchcock

Angiosperms	Common Name	Synonyms
Krameriaceae 2 species (2 taxa)		
<i>Krameria erecta</i>	Range ratany	<i>K. parvifolia</i> Benth.; <i>K. glandulosa</i> Rose & J. H. Painter; <i>K. parvifolia</i> var. <i>imparata</i> J.F. Macbride
<i>Krameria grayi</i>	White ratany	<i>Krameria canescens</i> A. Gray
Lamiaceae 4 species (4 taxa)		
<i>Monardella odoratissima</i>	Mountain monardella	<i>Madronella oblongifolia</i> Rydb.; <i>Madronella sessilifolia</i> Rydb.
<i>Poliomintha incana</i>	Purple sage	<i>Hedeoma incana</i> Torr. in Emory
<i>Salazaria mexicana</i>	Bladder sage	
<i>Salvia dorrii</i>	Dorr's sage	<i>Audibertia dorrii</i> Kellogg; <i>A. incana</i> Benth.; <i>Salvia carnosae</i> Douglas ex Greene
Loasaceae 1 species (1 taxon)		
<i>Petalonyx parryi</i>	Parry's sandpaper plant	<i>P. nitidus</i> ssp. <i>parryi</i> (A. Gray) Urban & Gilg
Oleaceae 5 species (5 taxa)		
<i>Forestiera pubescens</i>	Desert olive	<i>F. acuminata</i> β <i>parvifolia</i> A. Gray; <i>F. neomexicana</i> A. Gray
<i>Fraxinus anomala</i>	Single leaf ash	<i>F. anomala</i> var. <i>triphylla</i> M.E. Jones
<i>Fraxinus velutina</i>	Velvet ash	<i>F. pennsylvanica</i> ssp. <i>velutina</i> (Torr.) G. N. Miller
<i>Menodora scabra</i>	Rough menodora	
<i>Menodora spinescens</i>	Spiny menodora	
Plantaginaceae 6 species (6 taxa)		
<i>Penstemon ambiguus</i> var. <i>laevis</i>	Bush penstemon	<i>Leiostemon purpureum</i> Raf.; <i>L. ambiguus</i> (Torr.) Greene
<i>Penstemon deustus</i> var. <i>pedicellatus</i>	Hotrock penstemon	
<i>Penstemon linarioides</i>	Flaxleaf penstemon	
<i>Penstemon montanus</i>	Cordroot penstemon	
<i>Penstemon petiolatus</i>	Crevice penstemon	
<i>Penstemon sepalulus</i>	Littlecup penstemon	<i>P. azureus</i> var. <i>ambiguus</i> A. Gray

Angiosperms	Common Name	Synonyms
Polemoniaceae 8 species (9 taxa)		
<i>Ipomopsis congesta</i>	Ballhead Gilia	<i>Gilia congesta</i> Hook.; <i>G. congesta</i> var. <i>paniculata</i> M.E. Jones; <i>Gilia congesta</i> var. <i>frutescens</i> (Rydb.) S.L. Welsh
<i>Ipomopsis roseata</i>	Roseate Gilia	<i>Gilia congesta</i> var. <i>nuda</i> Eastwood; <i>G. roseata</i> Rydb.
<i>Leptosiphon nuttallii</i>	Flaxflower	<i>Linanthastrum nuttallii</i> (A. Gray) Ewan; <i>Gilia nuttallii</i> A. Gray; <i>Linanthus nuttallii</i> (A. Gray) Greene ex Mil- liken; <i>Leptodactylon nuttallii</i> (A. Gray) Rydb.
<i>Linanthus caespitosus</i>	Mat prickly phlox	<i>Leptodactylon caespitosum</i> Nutt.
<i>Linanthus pungens</i>	Granite prickly phlox	<i>Leptodactylon pungens</i> (Torr.) Nutt.
<i>Linanthus watsonii</i>	Watson's prickly phlox	<i>Leptodactylon watsonii</i> (A. Gray) Rydb.
<i>Phlox austromontana</i> var. <i>austromontana</i>	Desert phlox	
<i>Phlox austromontana</i> var. <i>prostrata</i>	Silver Reef phlox	
<i>Phlox jonesii</i>	Zion phlox	<i>Phlox austromontana</i> var. <i>jonesii</i> (Wheery) S.L. Welsh
Polygalaceae 2 species (2 taxa)		
<i>Polygala acanthoclada</i>	Thorny milkwort	<i>Polygala intermontana</i> Wend.
<i>Polygala subspinoso</i>	Cushion milkwort	
Polygonaceae 17 species (30 taxa)		
<i>Eriogonum ammophilum</i>	lbex buckwheat	<i>Eriogonum nummularum</i> M.E. Jones var. <i>ammophilum</i> (Reveal) S.L. Welsh
<i>Eriogonum bicolor</i>	Pretty buckwheat	<i>E. microthecum</i> ssp. <i>bicolor</i> (M.E. Jones) Stokes
<i>Eriogonum clavellatum</i>	Comb wash buckwheat	<i>E. pelinophilum</i> Reveal
<i>Eriogonum contortum</i>	Grand buckwheat	<i>E. effusum</i> ssp. <i>contortum</i> (Small ex Rydb.) Stokes
<i>Eriogonum corymbosum</i> var. <i>aureum</i>	Golden buckwheat	<i>Eriogonum aureum</i> M.E. Jones; <i>E. microthecum</i> Nutt. subsp. <i>aureum</i> (M.E. Jones) S. Stokes

Angiosperms	Common Name	Synonyms
<i>Eriogonum corymbosum</i> var. <i>corymbosum</i>	Crispleaf buckwheat	<i>Eriogonum corymbosum</i> var. <i>divaricatum</i> Torr. & A. Gray; <i>E. corymbosum</i> var. <i>erectum</i> Reveal & Brotherson; <i>E. divergens</i> Small; <i>E. effusum</i> Nuttall subsp. <i>divaricatum</i> (Torr. & A. Gray) S. Stokes; <i>E. effusum</i> subsp. <i>durum</i> S. Stokes; <i>E. effusum</i> subsp. <i>salinum</i> (A. Nelson) S. Stokes
<i>Eriogonum corymbosum</i> var. <i>glutinosum</i>	Sticky buckwheat	<i>Eriogonum aureum</i> M.E. Jones var. <i>glutinosum</i> M.E. Jones; <i>E. microthecum</i> Nutt. var. <i>crispum</i> (L.O. Williams) S. Stokes
<i>Eriogonum corymbosum</i> var. <i>heilii</i>	Heil's buckwheat	
<i>Eriogonum corymbosum</i> var. <i>orbiculatum</i>	Roundleaf buckwheat	<i>Eriogonum effusum</i> Nutt. subsp. <i>orbiculatum</i> S. Stokes
<i>Eriogonum corymbosum</i> var. <i>revelianum</i>	Reveal's buckwheat	<i>Eriogonum revelianum</i> S.L. Welsh
<i>Eriogonum corymbosum</i> var. <i>velutinum</i>	Velvety buckwheat	
<i>Eriogonum fasciculatum</i> var. <i>polifolium</i>	Mojave buckwheat	<i>Eriogonum polifolium</i> Benth. in A. P. DC. and A L.P. P. DC.; <i>E. fasciculatum</i> var. <i>revolutum</i> (Goodding) S. Stokes
<i>Eriogonum heermannii</i> var. <i>subspinosum</i>	Tabeau Peak buckwheat	
<i>Eriogonum heermannii</i> var. <i>sulcatum</i>	Limestone buckwheat	<i>Eriogonum sulcatum</i> S. Watson; <i>E. heermannii</i> subsp. <i>sulcatum</i> (S. Watson) S. Stokes
<i>Eriogonum hylophilum</i>	Gate Canyon buckwheat	<i>E. corymbosum</i> var. <i>hylophilum</i>
<i>Eriogonum lancifolium</i>	Lanceleaf buckwheat	<i>Eriogonum. corymbosum</i> Bentham in DC. var. <i>aureum</i> (M.E. Jones) Reveal; <i>Eriogonum corymbosum</i> var. <i>davidsei</i> Reveal
<i>Eriogonum leptocladon</i> var. <i>leptocladon</i>	Sand buckwheat	<i>Eriogonum effusum</i> Nutt. var. <i>shandsii</i> S. Stokes
<i>Eriogonum leptocladon</i> var. <i>papiliunculi</i>	Butterfly buckwheat	
<i>Eriogonum leptocladon</i> var. <i>ramosissimum</i>	San Juan buckwheat	<i>Eriogonum ramosissimum</i> Eastwood; <i>E. effusum</i> Nutt. subsp. <i>pallidum</i> (Small) S. Stokes
<i>Eriogonum leptophyllum</i>	Slenderleaf buckwheat	<i>E. effusum</i> var. <i>leptophyllum</i> Torr.; <i>E. microthecum</i> var. <i>leptophyllum</i> (Torr.) Torr. & A. Gray
<i>Eriogonum lonchophyllum</i>	Longleaf buckwheat	<i>E. intermontanum</i> Reveal; <i>E. humivagans</i> Reveal
<i>Eriogonum microthecum</i> var. <i>lapidicola</i>	Pahute Mesa buckwheat	

Angiosperms	Common Name	Synonyms
<i>Eriogonum microthecum</i> var. <i>laxiflorum</i>	Basin buckwheat	<i>Eriogonum confertiflorum</i> Benth.; <i>E. microthecum</i> subsp. <i>confertiflorum</i> (Benth.) S. Stokes; <i>E. microthecum</i> subsp. <i>laxiflorum</i> (Hook.) S. Stokes
<i>Eriogonum microthecum</i> var. <i>phoeniceum</i>	Scarlet buckwheat	<i>Eriogonum phoeniceum</i> L. M. Shultz
<i>Eriogonum microthecum</i> var. <i>simpsonii</i>	Simpson's buckwheat	<i>Eriogonum simpsonii</i> Benth.; <i>E. microthecum</i> var. <i>foliosum</i> (Torr. & A. Gray) Reveal; <i>E. microthecum</i> var. <i>macdougalii</i> (Gandoger) S. Stokes
<i>Eriogonum nummulare</i>	Coin buckwheat	<i>E. kearneyi</i> Tidestrom; <i>E. dudleyantum</i> Stokes
<i>Eriogonum smithii</i>	Smith's buckwheat	<i>E. corymbosum</i> var. <i>smithii</i> (Reveal) S.L. Welsh
<i>Eriogonum umbellatum</i> var. <i>juniporinum</i>	Juniper sulphur flower	
<i>Eriogonum umbellatum</i> var. <i>subaridum</i>	Arid buckwheat	<i>Eriogonum biumbellatum</i> Rydb.; <i>E. umbellatum</i> subsp. <i>ferrissii</i> (A. Nelson) S. Stokes; <i>E. umbellatum</i> subsp. <i>subaridum</i> (S. Stokes) Munz
<i>Eriogonum wrightii</i> var. <i>wrightii</i>	Wright's buckwheat	<i>Eriogonum trachygonum</i> Torr. ex Benth. subsp. <i>wrightii</i> (Torr. ex Benth.) S. Stokes

Ranunculaceae 4 species (4 taxa)

<i>Clematis columbiana</i>	Rocky Mountain clematis	<i>Atragene columbiana</i> Nutt.
<i>Clematis ligusticifolia</i>	White virgins-bower	<i>Clematis ligusticifolia</i> var. <i>brevifolia</i> Nutt.; <i>C. ligusticifolia</i> var. <i>californica</i> S. Watson; <i>C. neomexicana</i> Wooton & Standley; <i>C. suksdorfii</i> B.L. Robinson
<i>Clematis occidentalis</i> var. <i>grosseserrata</i>	Purple virgins-bower	<i>Atragene occidentalis</i> Hornemann
<i>Clematis orientalis</i> *	Oriental clematis	<i>Viticella orientalis</i> (L.) W. A. Weber

Rhamnaceae 6 species (7 taxa)

<i>Ceanothus fendleri</i>	Fendler's mountain lilac	<i>C. fendleri</i> var. <i>viridis</i> M.E. Jones
<i>Ceanothus greggii</i> var. <i>franklinii</i>	Franklin's ceanothus	
<i>Ceanothus greggii</i> var. <i>vestitus</i>	Mojave ceanothus	<i>C. vestitus</i> Greene
<i>Ceanothus martini</i>	Martin's ceanothus	<i>C. utahensis</i> Eastwood
<i>Ceanothus velutinus</i>	Deer-brush	
<i>Rhamnus alnifolia</i>	Alder buckthorn	

Angiosperms	Common Name	Synonyms
<i>Rhamnus betulifolia</i>	Birchleaf buckthorn	
Rosaceae 33 species (34 taxa)		
<i>Amelanchier alnifolia</i>	Serviceberry	<i>Aronia alnifolia</i> Nutt.; <i>Amelanchier pumila</i> (Nutt.) Roemer; <i>A. alnifolia</i> var. <i>pumila</i> (Nutt.) A. Nelson; <i>A. alnifolia</i> var. <i>cusickii</i> (Fernald) C.L. Hitchcock
<i>Amelanchier utahensis</i>	Utah serviceberry	<i>A. oreophila</i> A. Nelson; <i>A. utahensis</i> ssp. <i>oreophila</i> (A. Nelson) Clokey; <i>A. florida</i> var. <i>oreophila</i> (A. Nelson) R.J. Davis; <i>A. utahensis</i> var. <i>cinerea</i> Goodding; <i>A. jonesiana</i> Schneider; <i>A. covillei</i> Standley; <i>A. utahensis</i> var. <i>covillei</i> (Standley) N.H. Holmgren; <i>A. nitens</i> Tidestrom
<i>Cercocarpus intricatus</i>	Dwarf mountain mahogany	<i>C. ledifolius</i> var. <i>intricatus</i> (S. Watson) M.E. Jones; <i>C. arizonicus</i> M. E. Jones; <i>C. intricatus</i> var. <i>villosus</i> Schneider
<i>Cercocarpus ledifolius</i>	Curl-leaf mountain mahogany	<i>C. ledifolius</i> var. <i>intercedens</i> Schneider f. <i>hirsutus</i> Schneider; <i>C. ledifolius</i> var. <i>intercedens</i> f. <i>subglaber</i> Schneider; <i>C. ledifolius</i> var. <i>intermontanus</i> N.H. Holmgren
<i>Cercocarpus montanus</i>	Alderleaf mountain mahogany	<i>C. flabellifolius</i> Rydb.
<i>Chamaebatiaria millefolium</i>	Fern bush	<i>Spiraea millefolium</i> Torr.
<i>Coleogyne ramosissima</i>	Blackbrush	
<i>Crataegus chrysocarpa</i>	Fireberry	<i>C. rotundifolia</i> Moench
<i>Crataegus columbiana</i>	Red hawthorn	
<i>Crataegus douglasii</i> var. <i>duchesnensis</i>	Duchesne hawthorn	<i>C. saligna</i> E.L. Greene
<i>Crataegus douglasii</i> var. <i>rivularis</i>	River hawthorn	<i>C. rivularis</i> Nutt. in Torr. & A. Gray
<i>Crataegus erythropoda</i>	Rocky Mountain hawthorn	
<i>Dasiphora fruticosa</i>	Shrubby cinquefoil	<i>Potentilla fruticosa</i> L.; <i>Pentaphylloides fruticosa</i> (L.) O.Swartz; <i>Pentaphylloides floribunda</i> (Pursh) A. Love; <i>Dasiphora riparia</i> Raf.
<i>Dryas octopetala</i>	Mountain avens	<i>Dryas hookeriana</i> Juz.
<i>Fallugia paradoxa</i>	Apache plume	<i>Sieversia paradoxa</i> D. Don
<i>Holodiscus dumosus</i>	Mountain spray	<i>Spiraea dumosa</i> Nutt. ex Hook.; <i>Holodiscus microphyllus</i> Rydb.
<i>Peraphyllum ramosissimum</i>	Squaw apple	

Angiosperms	Common Name	Synonyms
<i>Petrophytum caespitosum</i>	Rock spiraea	<i>Spiraea caespitosa</i> Nutt.
<i>Physocarpus alternans</i>	Dwarf ninebark	<i>Neillia monogyna</i> var. <i>alternans</i> M.E. Jones; <i>Opulaster alternans</i> (M.E. Jones) A. Heller
<i>Physocarpus malvaceus</i>	Mallow ninebark	<i>Spiraea opulifolia</i> □ <i>pauciflora</i> Torr. & A. Gray; <i>Niellia malvacea</i> Greene; <i>Opulaster malvaceus</i> (Greene) Kuntze; <i>Niellia monogyna</i> var. <i>malvaceae</i> (Greene) M.E. Jones
<i>Physocarpus monogynus</i>	Mountain ninebark	<i>Spiraea monogyna</i> Torr.; <i>Neillia monogyna</i> (Torr.) Greene; <i>Opulaster monogynus</i> (Torr.) Kuntze
<i>Prunus emarginata</i>	Bitter cherry	<i>Cerasus emarginata</i> Douglas ex Hook.
<i>Prunus fasciculata</i>	Desert almond	<i>Emplectocladus fasciculatus</i> Torr.
<i>Prunus virginiana</i> var. <i>melanocarpa</i>	Chokecherry	<i>Cerasus demissa</i> var. <i>melanocarpa</i> A. Nelson
<i>Purshia glandulosa</i>	Glandular bitterbrush	<i>P. tridentata</i> var. <i>glandulosa</i> (Curran) M.E. Jones
<i>Purshia stansburyana</i>	Cliffrose	<i>Cowania mexicana</i> D. Don; <i>Purshia stansburiana</i> (Torr.) Henrickson; <i>Cowania stansburyana</i> Torr. in Stansbury; <i>C. mexicana</i> var. <i>stansburyana</i> (Torr.) Jepson
<i>Purshia tridentata</i>	Bitterbrush	<i>Tigarea tridentata</i> Pursh
<i>Rosa nutkana</i>	Nootka rose	
<i>Rosa woodsii</i>	Woods' rose	<i>R. chrysocarpa</i> Rydb.; <i>R. puberulenta</i> Rydb.
<i>Rubus idaeus</i> var. <i>strigosus</i>	Wild raspberry	
<i>Rubus leucodermis</i>	Black raspberry	
<i>Rubus neomexicanus</i>	New Mexico thimbleberry	
<i>Rubus parviflorus</i> var. <i>parviflorus</i>	Thimbleberry	
<i>Sorbus scopulina</i>	Rocky mountain ash	

Rubiaceae 3 species (3 taxa)

<i>Galium multiflorum</i>	Shrubby bedstraw	<i>G. multiflorum</i> var. <i>watsonii</i> A. Gray; <i>G. munzii</i> Hilend & J.T. Howell; <i>G. hypotrichium</i> ssp. <i>utahense</i> Ehrendorfer; <i>G. hypotrichium</i> ssp. <i>scabriusculum</i> Ehrendorfer; <i>G. emeryense</i> Dempster & Ehrendorfer; <i>G. scabriusculum</i> ssp. <i>protoscabriusculum</i> Dempster & Ehrendorfer; <i>G. desereticum</i> Dempster & Ehrendorfer
---------------------------	------------------	---

Angiosperms	Common Name	Synonyms
<i>Galium stellatum</i>	Stellate bedstraw	
<i>Galium wrightii</i>	Wright's bedstraw	
Rutaceae 2 species (2 taxa)		
<i>Ptelea trifoliata</i> ssp. <i>pallida</i>	Hoptree	
<i>Thamnosma montana</i>	Desert-rue	
Salicaceae 28 species (28 taxa)		
<i>Populus angustifolia</i>	Narrowleaf cottonwood	<i>Populus canadensis</i> var. <i>angustifolia</i> (E. James) Wesm.; <i>P. balsamifera</i> var. <i>angustifolia</i> (E. James) S. Watson
<i>Populus fremontii</i>	Fremont cottonwood	<i>P. deltoides</i> var. <i>fremontii</i> (S. Watson) Cronquist; <i>P. canadensis</i> var. <i>fremontii</i> (S. Watson) Kuntze
<i>Populus</i> x <i>acuminata</i>	Lanceleaf cottonwood	<i>P. x intercurrents</i> S. Goodrich & S.L. Welsh
<i>Populus tremuloides</i>	Quaking aspen	<i>P. tremula</i> subsp. <i>tremuloides</i> (Michx.) Á. Löve & D. Löve; <i>P. aurea</i> Tidestrom; <i>P. tremuloides</i> var. <i>aurea</i> (Tidestrom) Daniels
<i>Populus trichocarpa</i>	Black cottonwood	<i>P. balsamifera</i> ssp. <i>trichocarpa</i> (Torr. & A. Gray) Brayshaw
<i>Salix amygdaloides</i>	Peachleaf willow	
<i>Salix arctica</i>	Arctic willow	
<i>Salix arizonica</i>	Arizona willow	
<i>Salix bebbiana</i>	Bebb's willow	<i>S. rostrata</i> Richardson; <i>S. perrostrata</i> Rydb.; <i>S. rostrata</i> var. <i>perrostrata</i> (Rydb.) Fernald
<i>Salix boothii</i>	Booth's willow	
<i>Salix brachycarpa</i>	Short-fruit willow	
<i>Salix cascadenis</i>	Cascades willow	<i>S. tenera</i> Andersson
<i>Salix drummondiana</i>	Drummond's willow	<i>S. subcoerulea</i> Piper
<i>Salix eriocephala</i>	Graybark willow	<i>Salix lutea</i> Nutt.; <i>S. cordata</i> Muhlenberg; <i>S. rigida</i> Muhlenberg; <i>S. lutea</i> var. <i>platyphylla</i> C.R. Ball
<i>Salix exigua</i>	Sandbar willow	<i>S. stenophylla</i> Rydb.
<i>Salix fragilis</i> *	Crack willow	
<i>Salix geyeriana</i> var. <i>geyeriana</i>	Geyer's willow	<i>S. microcarpa</i> Nutt.
<i>Salix glauca</i>	Gray willow	<i>S. pseudolapponum</i> Seemann

Angiosperms	Common Name	Synonyms
<i>Salix gooddingii</i>	Black willow	<i>S. nigra</i> var. <i>vallicola</i> Dudley, <i>S. gooddingii</i> var. <i>variabilis</i> C. Ball
<i>Salix laevigata</i>	Red willow	<i>S. bonplandiana</i> var. <i>laevigata</i> (Bebb) Dorn
<i>Salix lasiolepis</i>	Arroyo willow	<i>S. bigelovii</i> Torr.
<i>Salix lucida</i> var. <i>caudata</i>	Whiplash willow	<i>Salix lasiandra</i> var. <i>caudata</i> (Nutt.) Sudworth; <i>S. pentandra</i> var. <i>caudata</i> Nutt.; <i>S. caudata</i> (Nutt.) A. Heller; <i>S. lasiandra</i> subsp. <i>caudata</i> (Nutt.) E. Murray; <i>S. lucida</i> subsp. <i>caudata</i> (Nutt.) E. Murray
<i>Salix melanopsis</i>	Dusky willow	<i>S. bolanderiana</i> Rowlee
<i>Salix monticola</i>	Mountain willow	
<i>Salix planifolia</i>	Plane-leaf willow	<i>S. phylicifolia</i> ssp. <i>planifolia</i> (Pursh) Breitung
<i>Salix reticulata</i> var. <i>nivalis</i>	Snow willow	
<i>Salix scouleriana</i>	Scouler's willow	<i>Salix scouleriana</i> var. <i>poikila</i> C.K. Schneider
<i>Salix wolfii</i> var. <i>wolfii</i>	Wolf's willow	

Sapindaceae 3 species (3 taxa)

<i>Acer glabrum</i>	Rocky Mountain maple	<i>Acer tripartitum</i> Nutt.
<i>Acer grandidentatum</i>	Bigtooth maple	<i>Acer saccharum</i> var. <i>grandidentatum</i> (Nutt.) Sudworth
<i>Acer negundo</i>	Boxelder	<i>Acer kingii</i> Britton, <i>Negundo californicum</i> Torr. & A. Gray; <i>A. interior</i> Britton

Sarcobataceae 1 species (1 taxon)

<i>Sarcobatus vermiculatus</i> var. <i>vermiculatus</i>	Greasewood	<i>Batis vermiculata</i> Hook.; <i>Fremontia vermiculata</i> (Hook.) Torr.; <i>Sarcobatus maximilianii</i> Nees
---	------------	---

Scrophulariaceae 1 species (1 taxon)

<i>Buddleja utahensis</i>	Utah butterfly bush
---------------------------	---------------------

Simaroubaceae 1 species (1 taxon)

<i>Ailanthus altissima</i> *	Tree-of-heaven*	<i>Toxicodendron altissimum</i> Mill.
------------------------------	-----------------	---------------------------------------

Solanaceae 6 species (6 taxa)

<i>Lycium andersonii</i>	Anderson's lycium	
<i>Lycium barbarum</i> *	Matrimony vine*	<i>L. halamifolium</i> Mill.
<i>Lycium cooperi</i>	Cooper's lycium	
<i>Lycium pallidum</i>	Pale wolfberry	

Angiosperms	Common Name	Synonyms
<i>Lycium torreyi</i>	Torrey's lycium	
<i>Solanum dulcamara</i> *	European bittersweet	
Tamaricaceae 1 species (1 taxon)		
<i>Tamarix chinensis</i> *	Tamarisk*	<i>Tamarix ramosissima</i> Ledebour; <i>T. pentandra</i>
Ulmaceae 1 species (1 taxon)		
<i>Ulmus pumila</i> *	Siberian elm*	
Verbenaceae 1 species (1 taxon)		
<i>Aloysia wrightii</i>	Aloysia	<i>Lippia wrightii</i> A. Gray
Vitaceae 3 species (3 taxa)		
<i>Parthenocissus quinquefolia</i> *	Virginia creeper*	<i>Hedera quinquefolia</i> L.
<i>Parthenocissus vitacea</i>	Thicket creeper	<i>Ampelopsis quinquefolia</i> var. <i>vitacea</i> Knerr
<i>Vitis arizonica</i>	Canyon grape	
Zygophyllaceae 1 species (1 taxon)		
<i>Larrea tridentata</i>	Creosote bush	<i>Zygophyllum tridentatum</i> DC.; <i>Larrea glutinosa</i> Engelm.

51 families; 385 species; 446 taxa

*Introduced species commonly naturalized (11)

References

- Albee, B., L. Shultz, and S. Goodrich. 1988. Atlas of the Vascular Plants of Utah.
- Andersen, B. Desert Plants of Utah. EC-376. Utah Cooperative Extension Service, Utah State University, Logan, UT.
- Anderson, B., and A. H. Holmgren. 2002. Mountain Plants of Northeastern Utah. EC-319. Utah Cooperative Extension Service, Utah State University, Logan, UT.
- Arnberger, L. P. 1982. Flowers of the Southwest Mountains. Southwest Parks and Monuments Association, Tucson, AZ.
- Arnow, L., B. Albee, and A. Wickoff. 1980. Flora of the Central Wasatch Front, Utah. 2nd ed., revised. University of Utah Printing Service, Salt Lake City, UT.
- Bailey, L. H. 1963. How Plants Get Their Names. Dover Publications, New York, NY.
- Baldwin, B. G., S. Boyd, B. J. Ertter, R. W. Patterson, T. J. Rosatti, and D. H. Wilken, eds. 2002. Jepson Desert Manual: Vascular Plants of Southeastern California. University of California Press, Berkeley, Los Angeles, London.
- Benson, L. 1974. The Cacti of Arizona. 3rd ed., revised. University of Arizona Press, Tucson, AZ.
- Benson, L. 1977. The Cacti of Arizona. 3rd. ed., 3rd printing. University of Arizona Press, Tucson, AZ.
- Benson, L. 2002. Native Cacti of California. Stanford University Press, Stanford, CA.
- Benson, L., and R. A. Darrow. 1981. Trees and Shrubs of the Southwestern Deserts. 3rd ed. University of Arizona Press, Tucson, AZ.
- Bennie, S. 2002. The Encyclopedia of North American Trees. Firefly Books, Buffalo, NY.
- Blackwell, L. R. 2006. Great Basin Wildflowers: Guide to Common Wildflowers of the High Deserts of Nevada, Utah, and Oregon. Falcon Guide. Morris, Guilford, CT.
- Bowers, J. E. 1993. Shrubs and Trees of the Southwest Deserts. Western National Parks Association, Tucson, AZ.
- Bowers, J. E. 1999. Flowers and Shrubs of the Mojave Desert. Southwest Parks and Monuments Association, Tucson, AZ.
- Busco, J., and N. R. Morin. 2003. Native Plants for High-Elevation Western Gardens. Fulcrum, Golden, CO.
- Carter, J. L. 1988. Trees and Shrubs of Colorado. Johnson Books, Boulder, CO.
- Carter, J. L. 1997. Trees and Shrubs of New Mexico. Mimbres, dist. by Johnson Books, Boulder, CO.
- Center for Plant Conservation. <http://www.centerforplantconservation.org>.
- Charlet, D. A. 2008. Shah-Kan-Daw: Anthropogenic simplification of semi-arid vegetation structure. In USDA, Forest Service Proceedings, RMRS-P-52. Cedar City, UT, pp. 5–24.
- Charters, M., comp. California Plant Names: Latin and Greek Meanings and Derivations; A Dictionary of Botanical and Biographical Etymology. www.calflora.net/botanicalnames/.
- Coombes, A. J. 1994. Dictionary of Plant Names: Botanical Names and Their Common Name Equivalents. Timber Press, Portland, OR.
- Cronquist, A., A. H. Holmgren, N. H. Holmgren, and J. L. Reveal. 1972+. Intermountain Flora: Vascular Plants of the Intermountain West, USA. Vols. 1, 2B, 3A, 3B, 4, 5, 6. New York Botanical Garden, Bronx, NY.
- D'Antonio, C. M., and P. M. Vitousek. 1992. Biological invasions by exotic grasses, the grass fire cycle, and global change. *Annual Review of Ecology and Systematics* 23:63–88.
- Davis, R. J. 1952. Flora of Idaho. Brigham Young University Press, Provo, UT.
- Dodge, N. N. 1992. Flowers of the Southwest Deserts. Southwest Parks and Monuments Association, Tucson, AZ.
- Dole, J. W., and B. B. Rose. 1996. Shrubs and Trees of the Southern California Deserts. Footloose Press, North Hills, CA.
- Donoghue M. J. 2005. Key innovations, convergence, and success: Macroevolutionary lessons from plant phylogeny. *Paleobiology* 31:77–93.

- Dorn, R. D. 1997. Rocky Mountain Region Willow Identification. USDA, Forest Service, Denver, CO.
- Earle, W. H. 1990. Cacti of the Southwest. Rancho Arroyo, Tempe, AZ.
- Elmore, F. H. 1976. Shrubs and Trees of the Southwest Uplands. Southwest Parks and Monuments Association, Tucson, AZ.
- Epple, L. E. 1995. A Field Guide to the Plants of Arizona. LewAnn, Mesa, AZ, with SkyHouse, an imprint of Falcon Press, Helena, MT.
- Fagan, D. 1998. Canyon Country Wildflowers: A Field Guide to Common Wildflowers, Shrubs, and Trees. Falcon Guide. Falcon Press, Helena, MT.
- FAO World Resources 2000–2001. Food and Agricultural Organization of the United Nations and Forest Stewardship Council. <http://www.fao.org>.
- Flora of North America Editorial Committee, eds. 1993+. Flora of North America North of Mexico. Vols. 2, 3, 4, 5, 19, 20, 21, 26. Oxford Press, New York and Oxford. <http://www.efloras.org/>.
- Francis, J. K., ed. 2004. Wildland Shrubs of the United States and Its Territories: Thamnisc Descriptions; Vol. 1. General Technical Report IITF-GTR-26. USDA, Forest Service, International Institute of Tropical Forestry, San Juan, PR, and Rocky Mountain Research Station, Fort Collins, CO.
- Frisina, M. R., and C. L. Wambolt. 2004. Keying in on big sagebrush: A guide for identifying the four subspecies of big sagebrush. *Rangelands* 26(1):12–16.
- Fuller, T. C., and E. McClintock. 1986. Poisonous Plants of California. University of California Press, Berkeley, CA.
- Gaskin, J. F., and D. J. Kazmer. 2008. Introgression between saltcedars (*Tamarix chinensis* and *T. ramosissima*) in the USA invasion. *Biological Invasions* 11(5):1121–1130.
- Goodrich, S., and E. Neese. 1986. Uinta Basin Flora. USDA, Forest Service, Intermountain Region, Ogden, UT.
- Grant, V. and K. A. Grant. 1965. Flower Pollination in the Phlox Family. Columbia University Press, New York, NY.
- Guennel, G. K. 1995. Guide to Colorado Wildflowers, Vols. I and II. Westcliffe, Englewood, CO.
- Gurevitch, J., S. M. Scheiner, and J. A. Fox. 2006. The Ecology of Plants. Sinauer Associates, Sunderland, MA.
- Harper, K. T., L. L. St. Clair, K. H. Thorne, and W. M. Hess, eds. 1994. Natural History of the Colorado Plateau and Great Basin. University Press of Colorado, Niwot, CO.
- Harrington, H. D., and L. W. Durrell. 1957. How to Identify Plants. Swallow Press, Chicago, IL.
- Harrington, H. D. 1967. Edible Native Plants of the Rocky Mountains. University of New Mexico Press, Albuquerque, NM.
- Harris, J. G., and M. W. Harris. 2003. Plant Identification Terminology: An Illustrated Glossary. Spring Lake, Spring Lake, UT.
- Hayward, C. L. 1983. The High Uintas: Utah's Land of Lake and Forest. Monte L. Bean Life Science Museum, Provo, UT.
- Hickman, J. C., ed. 1993. The Jepson Manual: Higher Plants of California. University of California Press, Berkeley, CA.
- Hultine, K. R., J. Belnap, C. van Riper III, J. R. Ehleinger, P. E. Dennison, M. R. Lee, P. L. Nagler, K. A. Snyder, S. M. Uselman, and J. B. West. 2009. Tamarisk biocontrol in the western United States: Ecological and societal implications. *Frontiers in Ecology and the Environment*. www.frontiersin-ecology.org.
- Hyam, R., and R. Pankhurst. 1995. Plants and Their Names: A Concise Dictionary. Oxford University Press, New York, NY.
- Jaeger, E. C. 1978. A Source-Book of Biological Names and Terms. Charles C Thomas, Springfield, VA.
- Johnson, L. 2009. Polemoniaceae: Phlox Family, Version 02. January. <http://tolweb.org/polemoniaceae/20912/2009.0102>, in Tree of Life Web project.
- Juran, C., B. A. Roundy, and J. N. Davis. 2008. Wildfire rehabilitation success with and without chaining on the Henry Mountains, Utah. In USDA, Forest Service Proceedings, RMRS-P-52. Cedar City, UT, pp. 91–106.
- Kearney, T. H., R. Peebles, J. T. Howell, and E. McClintock. 1960. Arizona Flora. University of California Press, Berkeley, CA.
- Kershaw, L., A. MacKinnon, and J. Pojar. 1998. Plants of the Rocky Mountains. Lone Pine, Renton, WA.
- Knute, Adrian. 1991. Plants of the East Mojave. Wide Horizons Press, Cima, CA.
- Kuhns, M. 1998. Trees of Utah and the Intermountain West: A Guide to Identification and Use. Utah State University Press, Logan, UT.

- Lamb, S. H. 1989. *Woody Plants of the Southwest*. Sunstone Press, Santa Fe, NM.
- Lanner, R. M. 1984. *Trees of the Great Basin*. University of Nevada Press, Reno, NV.
- Lanner, R. M. 2002. *Conifers of California*. Cachuma Press, Los Olivos, CA.
- Lepper, M. G., and M. Felschner. 1977. Nitrogen fixation by *Cercocarpus ledifolius* (Rosaceae) in pioneer habitats. *Oecologia* 27:333–338.
- Mabberley, D. J. 1997. *The Plant-Book: A Portable Dictionary of the Vascular Plants*. 2nd ed. Cambridge University Press, Cambridge.
- MacKay, P. 2003. *Mojave Desert Wildflowers: A Field Guide to Wildflowers, Tress, and Shrubs of the Mojave Desert, Including the Mojave National Preserve, Death Valley National Park, and Joshua Tree National Park*. Globe Pequot Press, Guilford, CT.
- McArthur, E. D., and B. L. Welch. 1984. Proceedings: Symposium on the Biology of *Artemisia* and *Chrysothamnus* at Provo, Utah, July. USDA, Forest Service, Intermountain Research Station, Ogden, UT.
- McDougall, W. B. 1973. *Seed Plants of Northern Arizona*. Museum of Northern Arizona, Flagstaff, AZ.
- McKell, C. M. 1975. Shrubs—a neglected resource of arid landscapes. *Science* 187(4179):803–809.
- McMinn, H. E. 1974. *An Illustrated Manual of California Shrubs*. University of California Press, Berkeley, CA.
- Mee, W., J. Barnes, R. Kjelgren, R. Sutton, T. Cerny, and C. Johnson. 2003. *Waterwise: Native Plants for Intermountain Landscapes*. Utah State University Press, Logan, UT.
- Meyer, S. E., R. K. Kjelgren, D. G. Morrison, and W. A. Varga. 2009. *Landscaping on the New Frontier: Waterwise Design for the Intermountain West*. Utah State University Press, Logan, UT.
- Meyer, S. E., D. L. Nelson, S. Clement, and J. Beckstead. 2008. Cheatgrass (*Bromus tectorum*) biocontrol using indigenous fungal pathogens. In USDA, Forest Service Proceedings, RMRS-P-52, pp. 61–67.
- Mihalopoulos, N. G. 1972. *Common Poisonous Plants of Utah and the Intermountain West*. Educational Media, Salt Lake City, UT.
- Morhardt, S., and E. Morhardt. 2004. *California Desert Flowers: An Introduction to Families, Genera, and Species*. University of California Press, Berkeley, CA.
- Mozingo, H. 1987. *Shrubs of the Great Basin: A Natural History*. University of Nevada Press, Reno, NV.
- Munz, P. A., and D. D. Keck. 1973. *California Flora*. University of California Press, Berkeley, CA.
- Natureserve. <http://www.natureserve.org>.
- Nelson, R. 1976. *Plants of Zion National Park: Wildflowers, Trees, Shrubs, and Ferns*. Zion Natural History Association, Zion National Park, Springdale UT.
- Nelson, R. A. 1977. *Handbook of Rocky Mountain Plants*. Skyland, Estes Park, CO.
- Nelson, R. A., revised by R. L. Williams. 1992. *A Guide to Rocky Mountain Plants*. 5th ed. Roberts Rinehart, Lanham, MD.
- Newsholme, C. 2003. *Willows: The Genus Salix*. Timber Press, Portland, OR.
- Peattie, D. C. 1981. *A Natural History of Western Trees*. Houghton Mifflin, Boston, MA.
- Rentz, L. H., and F. G. Smith. 1980. *Plants of the Virgin Mountains: A Guide to the Common and Colorful Wildflowers, Cacti, Trees, and Shrubs Native to Arizona's Virgin Mountains*. U.S. Department of the Interior, Bureau of Land Management, Arizona Strip District, St. George, UT.
- Rhode, D. 2002. *Native Plants of Southern Nevada: An Ethnobotany*. University of Utah Press, Salt Lake City, UT.
- Roberts, R. P., and L. E. Urbatsch. 2004. Molecular phylogeny of *Chrysothamnus* and related genera (Asteraceae, Astereae) based on nuclear ribosomal 3' ETS and ITS sequence data. *Systematic Botany* 29(1):199–215.
- Robertson, L. 1999. *Southern Rocky Mountain Wildflowers*. Falcon, Helena, MT.
- Saxena, G., A. R. McCutcheon, S. Farmer, G. H. N. Towers, and R. E. W. Hancock. 1994. Antimicrobial constituents of *Rhus glabra*. *Journal of Ethnopharmacologia* 42(2):95–99.
- Scotland R. W., and A. H. Wortley. 2004. How many species of seed plants are there? *Taxon* 52:101–104.
- Shaw, R. J. 1995. *Utah Wildflowers: A Field Guide to Northern and Central Mountains and Valleys*. Utah State University Press, Logan, UT.
- Shaw, R. J. 1998. *Vascular Plants of Northern Utah: An Identification Manual*. Utah State University Press, Logan UT.
- Shultz, L. M. 2009. *Monograph of Artemisia subgenus Tridentatae (Asteraceae-Anthemideae)*. Systematic Botany Monographs, Vol. 89. American Society of Plant Taxonomists, Ann Arbor, MI.
- Shultz, L. M., R. D. Ramsey, and W. Lindquist. 2006. *Revised Atlas of Utah Plants*. L. M. Shultz, Floristics Lab, Utah State University; R. D. Ramsey, Remote Sensing/GIS Lab, Utah State University; W. Lindquist, Dept. of Wildland Resources, Utah State University; and C. Garrard, Remote Sensing/

- GIS Lab, Utah State University, Logan, UT. 2010: Shultz, L. M., R. D. Ramsey, W. Lindquist, and C. Garrard. 2010. Utah State University, Logan, UT: <http://earth.gis.usu.edu/plants/>.
- Spellenberg, R. 2003. Sonoran Desert Wildflowers: A Field Guide to Common Species of the Sonoran Desert, Including Anza-Borego Desert State Park, Saguaro National Park, Organ Pipe Cactus National Monument, Ironwood Forest National Monument, and the Sonoran Portion of Joshua Tree National Park. Falcon Guide. Globe Pequot Press, Guilford, CT.
- Stein, B. A., L. S. Kutner, J. S. Adams, eds. 2000. Precious Heritage: The status of biodiversity in the United States. Oxford University Press.
- Stewart, J. M. 1998. Mojave Desert Wildflowers: A Field Guide to High Desert Wildflowers of California, Nevada, and Arizona. Jon M. Stewart Photography, Albuquerque, NM.
- Stickler, D. 1997. Northwest Penstemons. Flower Press, Columbia Falls, MT.
- Stubbendieck, J., S. L. Hatch, and L. M. Landholt. 2003. North American Wildland Plants: A Field Guide. University of Nebraska Press, Lincoln, NE.
- Sutton, R., and C. W. Johnson. Landscape Plants from Utah's Mountains. EC-368. Utah Cooperative Extension Service, Utah State University, Logan, UT.
- Taylor, R. J. 1993. Sagebrush Country. Mountain Press, Missoula, MT.
- Taylor, R. J., and R. W. Valum. 1974. Wildflowers II: Sagebrush Country. Touchstone Press, Beaverton, OR.
- Thatcher, A. P., and V. L. Hart. 1974. Spy Mesa yields better understanding of pinyon-juniper range ecosystem. *Journal of Range Management* 27:354–357.
- Treshow, M., S. L. Welsh, and G. Moore. 1963. Guide to the Woody Plants of Utah. Brigham Young University Press, Provo, UT.
- TROPICOS. Missouri Botanical Garden. <http://www.tropicos.org> [accessed 4 Nov. 2010].
- Uno, G., R. Storey, and R. Moore. 2001. Principles of Botany. McGraw-Hill, Boston, MA.
- USDA Forest Service General Technical Report INT-1. 1972. Wildland Shrubs-Their Biology and Utilization. Eds. C.M. McKell, J. P. Blaisdell and J. R. Goodin. Intermountain Forest and Range Experiment Station.
- USDA, Forest Service. <http://www.fs.fed.us/database/>.
- USDA, Natural Resources Conservation Services. PLANTS database. <http://plants.usda.gov/>.
- Utah State University Cooperative Extension Service. Range Plants of Utah. <http://extension.usu.edu/rangeplants/>.
- Weber, W. A. 1976. Rocky Mountain Flora. University Press of Colorado, Niwot, CO.
- Weber, W. A., and R. C. Wittmann. 1996. Colorado Flora: Western Slope. University Press of Colorado, Niwot, CO.
- Welsh, S. L., and N. D. Atwood. 2009. Plant Endemism and Geoendemic Areas of Utah. Stanley Welsh, Orem, UT.
- Welsh, S. L., N. D. Atwood, S. Goodrich, and L. C. Higgins, eds. 2008. A Utah Flora. 4th ed., revised. Print Services, Brigham Young University, Provo, UT.
- Whitson, T. D., ed. 1987. Weeds and Poisonous Plants of Wyoming and Utah. Cooperative Extension Service, University of Wyoming, Laramie, WY.
- Whitson, T. D., ed. 2000. Weeds of the West. 9th ed. Western Society of Weed Science, in cooperation with the Western United States Land Grant Universities Cooperative Extension Services and the University of Wyoming, Jackson, WY.
- Winward, A. H. 2004. Sagebrush of Colorado: Taxonomy, Distribution, Ecology, and Management. Colorado Division of Wildlife, Denver, CO.
- Woodruff, D. W. 2010. The scarlet-flowered species of *Echinocereus* in Utah. *Sego Lily: Utah Native Plant Society Newsletter* 33(4):1, 4.
- Young, J. A., R. R. F. Eckert Jr., and R. A. Evans. 1979. Historical perspectives regarding the sagebrush ecosystem. In *The Sagebrush Ecosystem: A Symposium*. Utah State University, College of Natural Resources, Logan, UT, pp. 1–13.
- Zomlefer, W. B. 1989. Guide to Flowering Plant Families. University of North Carolina Press, Chapel Hill, NC.
- Zwinger, A. H. and B. B. Willard. 1996. Land above the Trees: A Guide to American Alpine Tundra. Johnson Books, Boulder, CO.